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PHYSICAL  
*Investigations & Deductions,*  
FROM  
MEDICAL AND SURGICAL FACTS.

RELATIVE TO THE  
CAUSES, NATURE AND REMEDIES  
OF THE  
DISEASES



OF A  
WARM AND VITIATED ATMOSPHERE,  
FROM

*Climate, Local Situation, or Season of the Year.*

TOGETHER WITH  
AN HISTORICAL INTRODUCTION

TO

**Physianthropy :**

OR THE

EXPERIMENTAL PHILOSOPHY OF HUMAN LIFE :

THAT OF

*DISEASES, AND ALSO OF REMEDIES.*

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Primoque medendi scientia, pars sapientia habebatur, ut et morborum curatio, et rerum naturæ contemplatio, sub iisdem auctoribus nata fit.

Rerum quoque naturæ, sibi conditionem vindicaverint, tanquam sine ea, trunca et debilis medicina effet. *Celsus Lib. 1.*

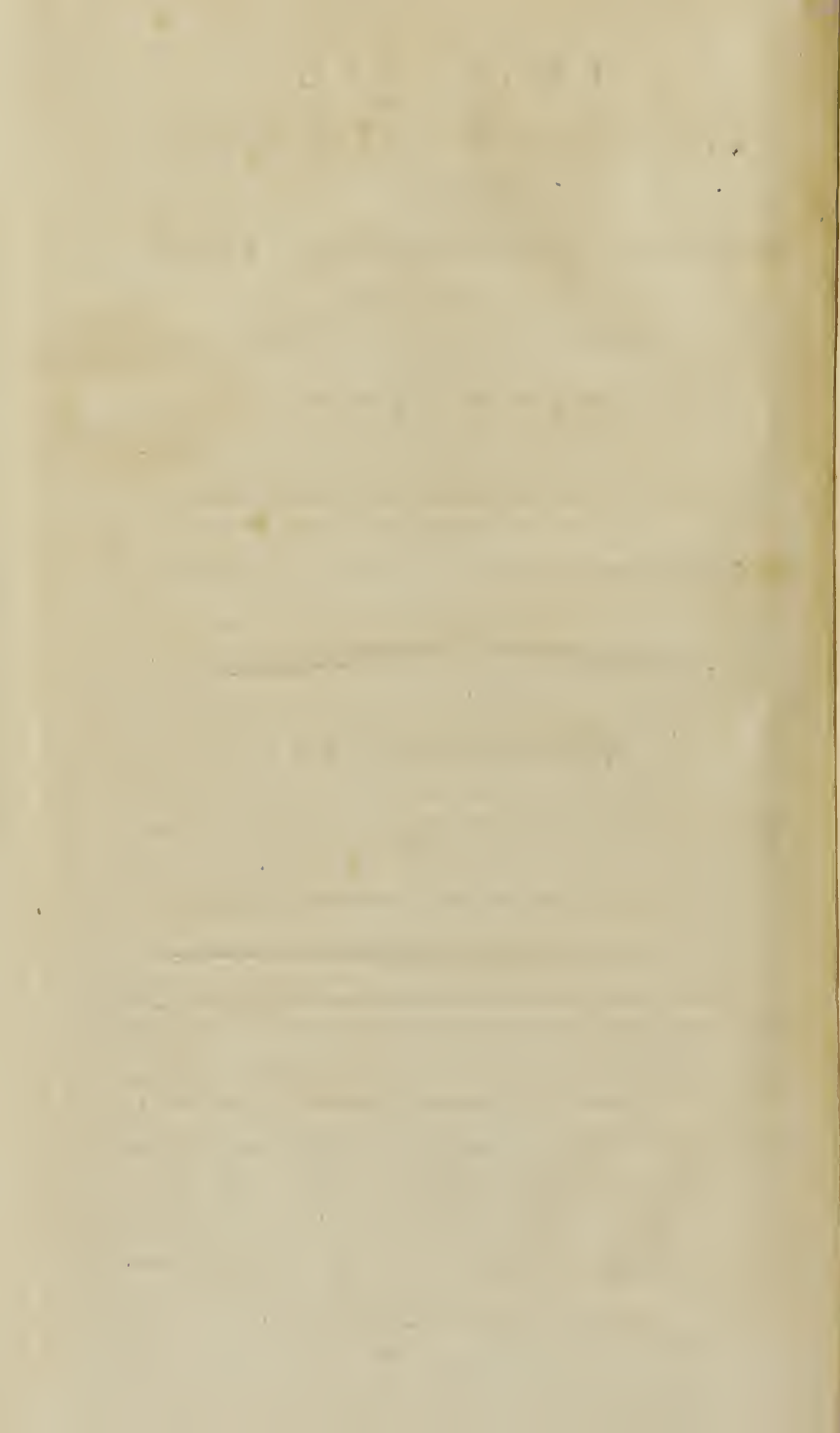
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PRINTED FOR THE AUTHOR.



## THE PREFACE.

THE present volume is intended to recommend those principles, and practices, which we have found most successful, in the diseases which most frequently occur in consequence of a warm temperature of the atmosphere; whether in tropical climates, or in the summer, and autumn, of more temperate latitudes. For although we have of late had many publications, on some of the subjects of our investigations; hitherto, we are not acquainted with any, which can supercede the utility of this. We have endeavoured to collect a knowledge of the causes, and to detect the external sources of diseases, which are derived from warm climates, local situations, or seasons of the year. And also the internal states of the body, which predispose some persons, more than others, to particular affections. How far we have succeeded, must be left to the intelligent, and candid part of mankind to determine. But we may premise, that no pains or labour, have been spared, in order to render it useful. And we believe very few authors of original merit, have escaped our perusal; in a course of about twenty years of study and practice; a large proportion of which was passed in warm, and unhealthy climates, during all of which time we have been collecting materials, as will appear by a perusal of the work—our principal aim having been to render it interesting to science, and useful to mankind.

We have therefore, divested it as much as in our power, of technical terms; and where they were unavoidable, their explanations have been generally added; in this form, we hope that it will be more generally useful, to gentlemen of all descriptions, and especially to those who go to warm climates, or who reside in the country; for as the summer, and autumnal diseases of temperate latitudes, are very similar to those of warm countries, there will be much information found here, respecting them, not to be found in any printed work, hitherto extant—so that even should we fail in rendering it entertaining, we are confident it will be useful, to those who may pay due attention to the perusal of it. But we may premise, that a work of this nature, will require more attention from the reader, than a hasty, or superficial performance. It is not intended for the carping critic, who only read to find

out defects ; nor for the superficial, or frivolous ; but for the cultivators of experimental science, and the application of it to practice—and with such we have already some assurances of its approbation.

But as experimental physical science, and practical medical pursuits, rather than the ornaments of language, have employed our attention ; our only aim is to be intelligible ; neither do we consider that physical pursuits, either require, or admit of the flowers of rhetoric, or the fictions of poetry.—But those who may think otherwise, are requested to confine their judgments to that part of the work, with which they may be well acquainted, as it would be necessary that their opportunities, should at least equal those of the writer, in the various subjects of investigation, before they can possibly be qualified for judges. In the present state of our acquisitions, we only consider ourselves in a state of progression, and not of perfection. Therefore, we would rather point out, what may appear to us, the best modes of proceeding, than prescribe rules to others ; for we prefer the mode of assisting them, in forming just conceptions of diseases, their causes, natures, and cures, rather than to form theories to their hands ; for as the opportunities, the capacities, and diligence of each individual differ ; the theory of one, never can be equally applicable to others. It is therefore the duty of each physician, to acquire as much genuine experimental medical science, as their opportunities, and their capacities will admit of—and they will find this the only useful foundation for a practical theory.

The sources of diseases, we consider as being derived from two great classes : the one of these, is from the external surrounding substances ; but principally from the state of the atmosphere, and its various impregnations. And the other from the internal formation of the body, the temperament, constitution, or habit, &c. To the external causes, belong the effects of climates, local situations, and the seasons of the year ; and in some measure also infections. These causes are of all others the most obvious ; they are therefore known, in some measure, to all mankind—to this class, principally, we shall confine ourselves in the present work.

As a subject closely connected with our other investigations, we have introduced a small specimen of our mode of reasoning, and of deducing consequences from facts, in physical geography, it being a subject peculiarly interesting, in all its departments ; we would wish to turn the general attention towards it. But as there are many peculiarities, in local situations, which cannot admit of being well explained under that head—we have chosen also, to give some separate sketches of medical topography ; and as infections are often unconnected with local situations, they have been attended to separately.

The analysis of medical surgery was introduced, in order the more clearly to demonstrate the necessity of the practice of

furgery, as the only certain, sensible, and experimental introduction, to the more abstruse practice, in the internal diseases of the human body, and also, as a popular introduction to the treatment of some of the most common surgical diseases, the defect of which we have often witnessed.

The affections in which the bile appears in excess; its aberrations, and defects, being closely related to the diseases of a warm atmosphere, and particularly the diseases of the liver—we have paid particular attention to these phenomena; and the diseases of the liver, will appear to merit more attention, than they have commonly received. We have, therefore, been the more particular on this class of diseases, having for many years had peculiar reasons, for considering them as diseases of the first magnitude.

Dysenteries, and diarrheas, being so nearly related, and often so difficult to be distinguished, we have treated of together, the better to explain their natures, and modes of treatment; other less important symptomatic affections of the first passages, are also taken notice of, at the same time. A general division of fevers might, with much propriety, be made into periodical and continued fevers, and their subdivisions, but we have followed the common mode of separation, into intermittents, from remittents, and delineating their innumerable varieties; but the genuine typhus fever, as it occurs in the British islands, we have never yet seen in America, unless in newly arrived emigrants; we therefore do not believe, it is a native production of the country. Therefore, what is said of it, is rather intended for an introduction to the pestilential fever, than a description of the typhus.

With respect to the modes of investigating the internal causes, natures, and remedies of diseases. The piece, termed *physianthropy*, was intended for a part of the preliminaries, of a private course of medical instructions, which has, for more than seven years employed much of our attention, the object of which is, to unite medicine with surgery; and the elementary principles with the practice of both, a small sketch of which is subjoined, which has not before been offered to the public; it is meant to be calculated so as to form a part of the liberal education of gentlemen, as well as of medical students, on their entering into the other particular departments of study, and practice, so as to convey the most comprehensive, general, and connected epitome of the whole. Something similar to what globes, or maps of the world convey, to those who are entering into the study of geography, and the plan is in considerable forwardness. For we believe that the divisions, and subdivisions of medical science, and practice, renders such a plan as this, the more necessary; for by exhibiting a chart of these subjects on a small scale, a more competent judgment may be formed of the extent, and comparative utility of the whole, and of its various departments.



We are well aware of the mass of deep rooted prejudices, the very opposite opinions, and sophistical doctrines, which many parts of these deductions have to encounter ; but as our great object has been the investigations of useful experimental science, and truth, we are happy in having some prospects, that it will in due time prevail, over all obstacles. Every part of our practical deductions, have been many years, submitted to the test of experience, and almost all of them in various parts of the world ; for although they might have been differently, and perhaps better arranged, they are not premature.

Those who are best acquainted with the difficulties, attending the original investigation of physical subjects, and the deduction of practical information, from medical and surgical facts, by experience and reason will, we do not doubt, be most ready to excuse any small defects which they may find here. The opinions of experienced practitioners, we have often found a difficulty in obtaining, hitherto ; but when in print, we shall hope for the sentiments of our medical friends, more at large. For some inaccuracies must have escaped us, but they are as few as we could prevent.

It must be the fate of this work, as it has been of its author, to make its way into the world, without the patronage of the great, or influential ; consequently, it must depend on its own intrinsic merit. But we have the consolation to be convinced, that none of those, whose judgments we most esteem, will form their opinions of the whole, or of any part of it, from that circumstance alone.

*January 4th, 1802.*

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A

SPECIMEN

OF

*PHYSICAL GEOGRAPHY.*

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AN investigation of the physical causes of heat and cold, and of their effects on the human body, may very properly precede a work on the diseases of warm climates, and those of the autumnal seasons of temperate countries. Registers of the state of the air, as its heat and weight; and also of its moisture, have long been common to medical men: But besides these, we find some local situations, having properties peculiar to themselves, as in the neighbourhood of marshes, rivers, mountains, sandy plains or populous towns, &c. by which means the properties of the air are often changed, and impregnated with miasmata, or effluvia of various species. But numerous observations, when loose and detached from one another, like the rude materials of a building, are seldom very instructive to the spectators, as they cannot without much labour and attention, discover the designs of the collectors; but, by endeavouring to find out the connecting parts, which may serve as a chain of investigation, we may facilitate enquiries of this nature, to those who are entering on these pursuits.

The present investigations are founded on observations: we mean also to trace the causes of these phenomena, and

also their effects : Here it will be perceived, that we are often obliged to take new paths, and to view our subjects in different directions ; and even this, if we should be so unfortunate as not to carry conviction, has been allowed to be useful in the pursuits of science. We consider physical Geography in particular, as well as the physical nature of the human body, as having been less cultivated than they should have been, especially when we remember the importance of these subjects to mankind.

In the present work we cannot attempt regular treatises on each of these subjects ; we only offer these pieces, as specimens, or sketches of what may be done in future. The effects produced by different climates, by heat and cold, by local situations, and the various states of the atmosphere, on the human body, have been long acknowledged by the observing part of mankind, so that scarce any practical work on medicine appears, without some observations to this purpose. By this means, others may be warned of those inconveniencies, which cannot be prevented, so as to guard against them ; and where prevention is practicable, we have endeavoured to point out the means by which it may be accomplished in the most effectual manner.

The effects of heat immediately applied to the human body through the medium of the atmosphere, when in a common state of purity, are different from those produced by its action, in decomposing other substances, either of vegetable, or animal origin ; and although they have commonly been blended together, they may admit of their separate properties, being more advantageously communicated, when considered each by themselves ; and hence we derive the propriety of separating physical geography from medical topography ; for although often connected, they are sometimes separate, as in the open ocean, particularly, topography is seldom applicable ; and although seamen are exposed to all the varieties of situation, and the diseases which are the effects of climate, yet this chiefly happens to them when in harbour, or on coasts, and they will there find the general observations, equally as applicable to them, as to others.

To physical geography also belongs the study of the mineral, vegetable and animal productions of countries; but we shall confine ourselves to its more immediate relation to mankind; principally with respect to the state of the atmosphere. Topography is always considered as a branch of geography, and in this sense we mean to treat of it here, rather as a necessary subordinate branch, than as a separate part of science; we entertain no doubt but this may be a more useful species of information, than several others which have been esteemed essential parts of medical information; than the chymistry of the arts, and many other pursuits which have amused physicians; but we do not mean to disapprove of these pursuits, by those who have sufficient time, and opportunities to improve in them, but to recommend those subjects which may be more useful to many persons, in different situations. But as the consideration of the various modes, either physical or mental, by which human bodies are affected, is the distinguishing line between the rational and the empirical practitioner, every means should certainly be cultivated, which is conducive to this intention. The properties of the various departments of regimen and medicines, &c. have been variously attended to: but the physical causes, and consequences of their effects, as deduced from experiments and observations, are hitherto, still in want both of cultivation and improvement; this must appear obvious to any person who will consider the heterogenous opinions and discordant modes of practice which are prevalent in the present times.

The first part of the investigation which we have chosen, has attracted the attention of as many observers and reasoners, as any phenomena of nature; it was chosen, because it was thought to be interesting, as well as curious. But as we had some new information to offer, and viewed subjects in different lights, to that in which most others have done, it has imperceptibly led us into a general review of physical geography. Here it will soon appear, that we do not attempt to trace diseases, merely by climates, and parallels of latitude.—Our plan has a tendency rather to expose the weakness, and insufficiency of this mode of rea-

soning, by stating the various other circumstances which affects the temperature of different parts of the world; and also the local causes, the changes which the air undergoes, by reason of the various exhalations with which it is impregnated. It may be excepted against us, that we pay little or no attention to the water of the places mentioned here; but the water which we drink, we have had sufficient reason to be convinced, is by no means of so much importance to health, as has been commonly alledged; unless where it is in a stagnant state, and impregnated with vegetable substances, &c. and when it is in this state, it is duly attended to. But the water which is used for drink being of very little importance with respect to health or sickness, the author first suspected on the following account: In some very unhealthy ports in India, it was the water which was accused of causing so much sickness; consequently, in order to avoid this source of diseases, we used Thames water of which we had a sufficiency, but without the least safety, or mitigation of the prevalent diseases, more than when we used the spring or river water of the country.

The following performance is the most material part of a paper which was read before the Philosophical Society of Philadelphia, five years past, which having met with the universal approbation of the society, was ordered to be printed, but was lost, or mislaid whilst in the press, and part of it printed, the author being at the time in a distant part of the country.

*An investigation of the Physical causes of the difference in the temperatures of the United States of North America, and corresponding latitudes in Europe.*

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Felix qui potuit rerum cognoscere causas.

*Virgil.*

**T**HERE are few natural phenomena more commonly observed, or more obvious to the senses, of those who are acquainted with the countries on both sides of the Atlantic, than the present subject of consideration; the philosopher, the navigator, and the emigrant, have observed it, ever since the communication has been opened; and many conjectures have of course been formed in order to account for it; these, as we might reasonably expect, were founded on the most obvious relative differences which prevailed between these two quarters of the world; as the state of cultivation, the face of the country, lakes and mountains. Of these, we shall select those which appear to be of the greatest consequence; for some of them do not merit any rational attention, and others produce effects, the very reverse of those which is alledged of them.

It may be necessary, in the first place, to take a general view of the temperature of different countries; and of the causes of the difference which prevail on account of latitude, or local situation; and here the inquirer will be obliged to pursue some new and uncultivated paths; but he has not exhausted the subject, there is much more to be done in the same manner, and by pursuing similar paths, still abundance of room lies open for new discoveries, and improvement in physical geography, navigation, &c.

Although the latitudes of different places, are of much importance with respect to their temperature, especially in the ocean, and also in small islands when sufficiently distant from continents; yet on land the elevation appears to influence it much more, as may be proven by the



coldness of high mountains in every part of the world, for three miles of perpendicular height above the level of the ocean, in warm or temperate climates; will be a more certain cause of a continued coldness, than sixty degrees of latitude, although our greatest mountains are only as the breadth of a hair, to a globe of six feet diameter; for at that height there is a constant frost, even in the torrid zone; but at Petersburg, in Russia, there are warm summers, and even in latitude  $80^{\circ}$ . north, there often has been warm weather in summer, as the Greenland whale-fishers can testify. But was the sea uninfluenced by land, by wind, or currents, we might come near determining the annual temperature, by the latitude of any place, but on land, elevation, and some other local circumstances, influence it much more, as we find by many observations made in different parts, &c.

The first apparent cause, and that which undoubtedly contributes to this difference, is the uncultivated state of the country, by reason of the small number of inhabitants, and the quantities of wood. I was very much pleased some years ago at meeting with a little essay in a London magazine, which was wrote by Dr. Hugh Williamson, on this subject; he has foretold many things relative to the climate, which we already see, in part, is coming to pass; that as the country comes to be closely inhabited, and the wood cut down, and the land cultivated, the cold of the winters would be less severe, this the old inhabitants of Philadelphia, and the neighbouring country can testify, is verifying every year, for there are scarce any winters at present so cold as formerly. For trees and bushes, or other vegetables, which shade the earth from the rays of the sun, must certainly prevent it from extricating the latent heat which is accumulated in the earth, and can be only set free, and made sensible by the operation of the solar rays, on this account a bare sandy country will always be hotter in summer, than a woody one. With respect to the number of fires, and the breathing of men, and other animals, which are always, by far more numerous in a cultivated, than in an uncultivated country; we cannot doubt but they produce a very sensible dif-

ference in making the air warmer than otherwise it would be, for a much greater number of animals are kept by men in a cultivated country, than it would be able to support, by its spontaneous productions, besides the number of men, and of fires, and other means which extricate latent heat, and make it sensible and fluid, instead of being fixed and imperceptible, and all land animals, as well as men, are continually diffusing some of their animal heat into the atmosphere around them, which they extricate from the air in breathing, and by the different animal functions. So that I have often seen a thermometer raised three or four degrees, by two or three people sitting in a close cabin on shipboard, in less than an hour. I can give all these causes their due weight, but yet there must be others, than the quantity of wood, or the want of inhabitants, and consequently of cultivation. Dr. Williamson's opinion that the summers, as well as the winters will grow more temperate by clearing the country merely, we cannot so readily agree with, although in some situations, it may conduce to a more free ventilation, and circulation of air, yet we cannot believe that it will make the thermometer one degree lower in summer; but from uncovering the earth, especially where it is sandy and stony, it will certainly heat the air more, as already stated, by the direct rays of the sun. The rays of light do not operate so powerfully, unless where they are resisted, as in solid, dense, or black substances; but when they fall upon a transparent body which admits them to pass through it, as water, or glass, very little heat is extricated, therefore the larger the body of land is together, as well as its being flat, bare, and sandy, or stony, the more hot it will become in the summer. Water, as the sea, or lakes, being transparent, suffers the rays of the sun to pass through, without obstructing them, and therefore very little heat is extricated from water by the sun, on this account large bodies of water are always temperate, both with respect to heat and cold, but large bodies of land, are the more intemperate, generally in proportion to their magnitude, and other considerations to be mentioned hereafter. On this account, islands, especially if small, and in the middle of a large

ocean, or far enough removed from the influence of any continent, so as not to be affected by its air, are the most temperate habitations: and the smaller the islands, and the farther they are from continents, they are the more temperate. But the larger any island is, and the more near it approaches, either in vicinity, or magnitude to a continent, the greater we may expect the excess as of heat and cold, their other relative situations being the same. The reason why water resists the excesses of cold, as well as heat, is because water being a moveable body, continually in motion, and agitation with the winds, prevents the surface from being so excessively cooled as the solid earth, by turning up the more temperate part of the water from below; hence, although small bodies of water freeze in the temperate climates, because they may be thoroughly cooled, as small lakes, or rivers; yet large collections of water will not freeze in similar situations, as the sea, or large and deep lakes, because the continuance of one winter is not sufficient to cool the large body of water sufficiently to freeze, and the coldest part, where exposed to the cold air near the surface, is, by the agitation of the wind, continually changing place with the hotter part from below. And so much for the general temperature of both large and small bodies of land, and of water.

High mountains are a very great cause of cold in any situation, or a high elevation of a country, principally by reason of the greater rarefaction of the air, on these elevated situations, and likewise their being detached a little above the common surface of the earth, although our greatest mountains, bear no greater proportion to the diameter of the earth, than the breadth of a hair to a globe of six feet, which is imperceptible; nevertheless, an elevation of three miles perpendicular higher than the surface of the sea, will be cold enough in any latitude, even within the tropics, to be covered with frost the whole year round; witness that on the island of Owyhee, where captain Cook was killed, and the Andes, and Cordilleras, in South America, this coldness on high mountains must be more owing to the rarefaction of the air, than any other cause; as heat is apt enough to ascend



upwards. A mile or two does not make any material alteration on a plain surface of either land or water; but the difference of the rarefaction of the air is very great in a mile perpendicular above the surface of the ocean, for the rarefied air cannot retain the heat in a sensible form, so well as a more dense body of air, is capable of; nevertheless, plains or vallies in the neighbourhood of these high, and cold mountains, may be very hot; scarce any thing less so, than if there were no such mountains in their vicinity, as neither their cold can descend with any great rapidity into the plains or vallies, nor the heat of these last ascend from its own dense medium below, to the rare medium above, but the winds in mountainous countries contribute to mix the hot air of the valleys, with the cold air of the mountains, beside the heated air below has a tendency to raise upwards, and must keep an almost constant circulation in mountainous and hilly countries, and therefore the air in them, must be somewhat colder, than in flat, low and sandy countries, as we may see in the low eastern parts of the Carolinas, and Georgia, and westwardly towards their hills and mountains, the country is much more cool, than towards the sea coast.

But the great ridges of mountains in North America, cannot be the cause of the superior cold of the winters, for there are much higher mountains in the same latitudes in Europe, and between some countries of the mildest climates on the continent, as the Alps, between France and Italy, which are remarkable for the pleasantness of their climates, and the Pyrennees, between France and Spain, very temperate countries; but some of these mountains are so high as to be covered with an eternal frost and snow, and yet the countries on both sides of them are not remarkably cold. The North American mountains exhibit no such cold in the summer, and therefore cannot be the cause of the superior coldness of the country over that of Europe.

Although wood and other vegetables may moderate the heat of summer, both by their shade, and by increasing the evaporating surface, as is sufficiently proven by convincing experiments generally known: yet there is no defi-

ciency of heat in summer, even in the most woody parts of America when these causes act most powerfully, as we may learn by comparison with other countries in the same latitudes, and similar as to situation on continents, &c. But it has been of late shewn, we believe by Mr. De Mairan, that the cold of winter is moderated by the heat which the earth imbibes in summer, or more properly speaking, by that which is extricated by the sun's rays; the influence of this however we believe is but little. The clearing and cultivating a country may, no doubt, obviate both these causes of coldness. The former state of this country, and its western parts at present, are not much different from those countries totally destitute of inhabitants, as the small number of them, even where most numerous, made but little alteration on the face of the country, by clearing or cultivation. But, on considering the subject, there appears to be some other more important reasons, hitherto unnoticed, for these already mentioned, are by no means adequate to produce the effect stated.

Recourse has also been had to the great lakes, to account for the coldness of the winters of North America; but any one who will consider what is already said of the effects of large bodies of water upon the air of their neighbourhood, must be persuaded that the lakes instead of making the climate more cold in the winter, will have the opposite effect, and soften the rigor of the winters, as well as temperate the heat of the summers; and the larger the body of water, the more powerfully it will operate in that way, whether lakes, or ocean; and as these lakes are both very large and numerous, their effects must be considerable, in rendering both the heats, and colds milder: for there are no virtues in salt water more than fresh, in that respect; for it is well known that these lakes never freeze, more than the sea, although a great cold will freeze a little about their borders. Water is known to be a great conductor of heat. Besides the agitation of winds is continually mixing the water on the surface, with that below it; but when the surface is much cooled in winter, the warmer water below will endeavour to rise upwards and change places with it; on these accounts the excesses of either cold or

heat are not so great on water as on land, for our hardest frosts, never penetrate six feet deep into the earth. On this account, large bodies of water, whether salt or fresh, seldom ever freeze in the temperate latitudes, especially where they are deep and broad. The great lakes never freezing, only for a small space about their shores, and the straits between them; salt water bays or lakes, require a greater cold to freeze them than fresh water does, and the salt separates in the freezing: the great masses of ice towards the poles, being all fresh water when dissolved, although frozen from sea water; the same process of freezing is used in some northern countries to make salt from seawater. On these accounts we invariably find sea-coasts, and the shores of large bays, and lakes universally more temperate than farther inland in all parts of the world; for the water imparts both its heat and cold more readily than the land, so that we are fully convinced the north western lakes, and even Hudson's bay, contributes to render the winters as well as the summers of North America more temperate than they would otherwise have been, were they not there.

There has lately come to view a piece on the effects of population, and the changes of temperature, by the Abbe Mann, in Belgium; he coincides with Dr. Williamson's opinion, with respect to clearing, and cultivation, and adduces many proofs from historians, and poets, for the effects produced in Europe by these means; but his researches appear to have been almost wholly confined to the Ancients; but to them he appears to have paid particular attention, on this subject, respecting Europe. His mode of investigating the subject is more in the style of a great classic scholar, than that of a modern experimental philosopher. He estimates the coldness of Europe from lat.  $40^{\circ}$ . to  $50^{\circ}$ . north, to be equal to that of Siberia, Lapland, or Hudson's bay, at present. It is to be remembered that these were natives of Rome, or of Italy, who wrote in those times, and the propensity of poets to exaggeration, is well known, or even of historians, when describing countries different from their own, for they do not appear to have had any other means of measuring the cold

than their sensations, or the freezing of rivers, which they sometimes make mention of. But even at that period, we have sufficient proof, that Europe was not so cold as other parts of the world in the same latitudes, or the Goths and Vandals, could not have been so numerous as they proved to be, a few ages afterwards.

But with respect to North America, the Abbe observes that the great breadth of the continent towards the polar circle, and its being so narrow in the torrid zone, must be the means of increasing the coldness of the winters; this object struck us on our first application to the subject, but we could not find it of much consequence; on farther consideration, and stating it in other points of view, especially when we take other subjects into consideration.

With respect to the breadth of the continent in the high northern latitudes being a cause of coldness, or the narrowness of it, in tropical countries being a cause of a deficiency of heat, we can only judge of this by a comparison with other countries, in similar situations; but as it is observed in the first place, that there are no deficiency of heat in summer, in America, one half of this argument falls here, and with respect to the other, whether a frozen region consists of ice, or of land, is very indifferent even as to its own temperature, and much less so, to that of distant countries; the only respect in which they can differ, is in the elevation, where there are mountains, but even their influence does not appear to extend far north or south, from themselves. We have no reason to suppose that we have our cold or heat from such distant parts, although winds are very expeditious vehicles of either, cold or heat. But it has not yet been proven that there are more of the new continent within the polar circle than there is of the old world. By Mr. Hearn's journey from Hudson's bay to the north west, it would appear that there is not, besides by far the greatest part of South America, is within the tropics, and yet the southern part of it is scarcely capable of cultivation beyond  $45^{\circ}$ . south, even on its western side, and the eastern not even to  $40^{\circ}$ . although its breadth there is scarcely 600 miles in a right line, and no other land near it to influence its temperature; for the larger the



ocean, the better it preserves the medium, and small islands or necks of land, always partake very much of the temperatures of the surrounding ocean, and the larger the continent, the greater the extremes of heat, or cold.

The many large tracks of marshy ground, have also been taken into the account by the Abbe Mann; it is probable from the accounts of travellers that there are more marshes in the interior parts of North America, than in any other part of the world; but even allowing this to be the case, their principal effects would only be that of moderating the heat of summer, as the same extent of water would do, at most; but their effects in increasing the coldness of winter must be very little, or nothing. Although we are not disposed to differ from such respectable authorities as Dr. Williamson, and the Abbe Mann, who exactly coincides with him in every particular, but respect them both for what they have done in their investigations, yet our own course of inquiry obliges us to differ from them, in believing that clearing and cultivating the country will lessen the heat of the summer, as well as the coldness of the winter; the heat of the summers must be increased by cutting down the woods, although it will allow a more free ventilation, as the bare surface will be more exposed. It is in the open ocean that we are to search for a standard of temperature in different latitudes, as Mr. Kirwan has pointed out. And it is remarkable that Captain Cook was not able to penetrate farther than  $71^{\circ}$ . south, and that only in one place, in several trials in different parts of the southern ocean. The very same latitude where he was stopped by the ice, to the northward of the straits between Asia and America. This therefore appears to be the natural boundary, between a continual ice and water, in other parts of it he could only get within the polar circle. But the northern part of the Atlantic is navigable to  $81^{\circ}$ . or  $82^{\circ}$ . every year, by the whale fishers. The reasons for this hitherto unaccounted for phenomena, we shall endeavour to adduce hereafter. But whether these mountains of ice, as they were named, rested on land or water, was very indifferent, with respect to the temperature of the surrounding atmosphere, unless what the height might

cause; but there was no land to be found there, and it is most probable that the ice was afloat in the sea.

Mr. Kirwan who has laboured more than any other, in order to ascertain the relative temperature of different countries, and latitudes, collected from thermometrical registers, in almost every place where they were made, always found, on forming an imaginary standard, taken from the different parts of the ocean, too much however adapted to Europe, from most of the observations being made there, that the Atlantic, near the continent of Europe, and those countries nearest it all along the western coasts, but particularly in the islands of Europe, were always higher than the standard, in the proportion of at least ten or fifteen degrees of latitude in their mean annual heat; but that in other parts of the world the temperature was rather below it; so that it is as cold in the United States, or in China, at  $40^{\circ}$  N. lat. as it is in Europe at  $55^{\circ}$ ; for America does not differ so much from any other part of the world, in this respect, as it does from Europe; for the eastern side of Asia, is altogether as rigorous in winter, and South-America is very near as much so: But in Europe the mildness of the cold is considerably greater, than in any other quarter of the world, and of this mildness, Britain and Ireland enjoys it in the greatest perfection, as no other part of the world is so temperate, between  $50^{\circ}$  and  $60^{\circ}$  N. latitude, from the advantages of their insular situation, and the temperature of the surrounding seas, which we shall examine hereafter; and the whole of the western coast of Europe is also more temperate than this continent is farther inland. In order to account for this mildness of the European winters, Mr. Kirwan adduces the breadth of the Atlantic, the northern part of it being not less than 700 miles; whereas, at lat.  $66^{\circ}$  the Pacific is narrowed to a strait of only 40 miles in width, between Asia and America. This must be allowed to be a circumstance of considerable importance; but others must be taken into view; for it is not the breadth of the ocean alone, that causes this difference, or otherwise the United States should partake also of the same effect in part, as they occupy one side of the Atlantic. But the continent of South-America, from  $44^{\circ}$  0' comes to be

only about 400 miles broad, and far enough from any other countries not to be affected by them. Yet from  $40^{\circ}$  S. lat. it is not remarkable for its warmth; for there is not a tree large enough to make a handle for an axe from Rio Plata to the southward, it being uninhabited, and a cold, inhospitable, barren coast; and on the west, I believe not farther than about  $45^{\circ}$ , it being unfit for cultivation, which appears to extend no farther south, notwithstanding the size, for which the Patagonians have been noted, who inhabit the southern extremity of this continent, towards the straits of Magellan, and their neighbours on Terra del Fuego, they appear all to be wandering hunters and fishermen, &c. and of the coldness of the climate, at the straits of Magellan, we are well assured by Capt. Cook, and other navigators, &c. By this, and similar facts and reasons, we may be fully convinced, that it is not the width of the Atlantic alone, that is the cause of the mildness of the European winters; for this we must endeavour to find other more convincing reasons.

In the next place we have to consider the effects of prevalent winds and currents of the ocean. In looking over a globe, or map of the world upon a small scale, I think upon an attentive consideration of it, we will find a more powerful cause of this coldness, than any yet mentioned. When last in China, and experiencing the coldness of the winter there in the month of January, 1791, I was struck with the similarity of the coldness of the winters, in the eastern sides of both the northern continents, and at the same time, the mildness of the European winters in the same latitude. I thought that some similar causes, must produce these similar effects.

We shall in the first place attend to the trade winds and their consequences, before we proceed farther. Where the trade winds are not intercepted by land, they prevail all round the globe, from  $30^{\circ}$  N. to  $30^{\circ}$  S. lat. they often prevail farther, to that side of the line, in which the sun is at the time; and not so far on the opposite side, reciprocally. This causes some local variation in their effects, at different seasons of the year, as well as, on the westerly winds, of the

temperate zone ; but we only intend to trace their general effects, at present, and their application to the subject in question.

As the trade winds prevail all round the globe for about  $60^{\circ} 0'$  in breadth, &c. from N. to S. in the warm latitudes, they would be regular all round the globe, from about  $30^{\circ}$  N. to  $30^{\circ}$  S. lat. unless where the intervention of land opposes an obstruction to their regular course; for they never prevail regularly, within a degree of any large island, or continent; but the rarefaction of the air, by the heat extricated from the land, causes the sea and land breezes, which prevail near the sea coasts, of all warm countries daily; for the air over the land, being hotter than the surrounding atmosphere, in the night, air being always rarefied by heat, and condensed by cold, is of consequence expelled towards the sea, until an equilibrium takes place, about eight or nine in the morning; after which the sea breeze sets in; and so they change alternately with one and another daily—this is the sea and land breeze of warm countries; and the larger the track of land, the farther does its influence extend out to sea. The periodical winds which annually occur in the West-Indies, the Chinese, and Indian seas, are owing to similar causes, in consequence however of the annual, instead of the diurnal heats, and colds; but in consequence of the strength, and long continuance of these winds, they prevail to a much greater distance from land, commonly to two or three hundred miles, but the daily winds, seldom more than ten or twelve leagues. But where there are many small islands, they interrupt the course of the trade winds considerably, as in the West-Indies, and among the Philippine Isles; but as the general course of the wind at sea, within the tropics, when uninfluenced by land, is from east to west, we shall also find a general current of the ocean in the same direction; for all winds impel the water in their direction, although interrupted by the intervention of land. A current sets round the Cape of Good-Hope from the Indian Ocean, and proceeding north-west, it is found to come again within the limits of



the trade winds towards the island of St. Helena. The water of the Atlantic is also impelled by these winds, to the west from Africa towards America, where it is intercepted by the Isthmus, which joins North and South America; and here its farther progress to the west being totally prevented, at the same time being forced forwards by the winds and currents from the east, it must be considerably elevated above the common level of the ocean; by which means there are no regular tides in the Gulf of Mexico. From this gulf, the only way left for it to escape by, is between the island of Cuba, and Cape Florida, from whence turning to the northward, between the Bahama Islands, and the east coast of Florida; it there runs very rapidly, and forms what is called the gulf stream; which after passing out of the straits, takes its course along the coasts of the Southern States of America, turning to the north east, so that it is some leagues (about 12 or 15 from Georgia,) from the coast, and from Cape Hatteras; it leaves the coast a long way, and totally disappears about  $42^{\circ}$  0. north, or takes its course slowly to the eastward, along with another current, which here appears to meet and oppose it; which setting to the southward, along the coast of Labradore, from Hudson's and Davis's Straits, and from Greenland, whose course and effects, we must presently describe.

But besides the trade wind and the currents, caused by it, there are other winds of a less gentle nature; (for they are seldom interrupted, even by land, &c. whether islands or continents,) which prevail from  $35^{\circ}$  0. to about  $60^{\circ}$  0. both in the northern and southern hemispheres, in the space between the trade wind, and the strong west winds, there are frequent calms and variable winds in both hemispheres. But in the higher latitudes, where the western winds prevail, for at least two thirds of their respective winters, most of the trees much exposed to the west have acquired a bend to the east, and have commonly more branches on their east, than on their western sides by the frequent pressure of these winter winds; and although these winds are not so steady as the trade winds, yet they are more so than any other winds yet known to us, and that prin-

cipally in the winters of the respective hemispheres, and towards the middle of their temperate zones, where they will of course find the least interruption. These winds are remarkable steady and strong, both in the northern and southern hemispheres, as we have repeatedly experienced, and winds we know always carry the temperature of the parts, over which they have lately passed along with them, as well as set currents of the ocean, in that direction. We must pay the more particular attention to their prevalent courses, although we allow that they often vary, but are mostly from the west. These western winds in high latitudes, are not near so complicated as the tropical winds are, nor interrupted with so many other periodical winds; but, on the other hand: we have not yet been able to find any regularity in the variable winds, either as to their periods, their causes, nor any other rational connexion of facts, or circumstances by which to trace them, neither do we consider this, as in the least affecting our principles; much less have we any means in our power to foretell their changes.

Towards the poles, and particularly within the polar circles, the wind blows mostly from the poles, and carries large masses of ice with it, as yearly happens in high latitudes, both north and south. But we have not yet sufficient data, to prove whether this continues the whole year round, or only on the approach of the sun, in summer; for although air, rarefied by the heat of the sun, will force its way against more cold and dense air; yet as soon as it is deprived of its heat, it must contract, and the dense air must force back to supply the vacuum; but dense air would always force rarefied air before it, were they left in equilibrium, it being so much the heaviest of the two.

We have now traced the most prevalent winds and currents. In the next place we may examine their physical effect, and modes of operating; we are well aware, however, that innumerable partial objections may be made. But it is only the general laws, and modes of action, that we can attend to here, remembering however, that they have been the result of innumerable ob-

servations, made at different times, in various parts of the world, as opportunities offered.

It is commonly observed, that wind blowing over a high mountainous country, is always colder, particularly to the eastward of them, than when it comes over a low, flat country. Therefore mountains are great sources of the coldness of the air; not by the air over them being rarefied, any more than it is at the same horizontal height any where else; but by their causing a mixture of the air, by the various directions into which they turn its currents, mixing the cold air above, with the warm air below; for the warm air has a tendency to ascend; and by their attracting lightning or electric fire, from the atmosphere, and thereby causing rains; because this active fluid, as well as heat, is a mean of keeping the water suspended in the air. Mountains also, by reason of their elevation above the horizon, the source from whence the sun's rays extricate heat, must on that account be colder than low plains, as their atmosphere must always be more distant from the common surface, they being projected points of the earth; although the greatest of them, yet known, bears no greater proportion to our globe of earth, than the breadth of a hair, to a globe of six feet diameter; but they are always in contact with cold air. An elevated country also, is always cold, as it is observed in Quito, in South America, and in Mexico; but greatest of all in Siberia, where there are the most excessive colds hitherto known; was it not very elevated, the heats of the summer must be great, because this is in the middle of the largest continent in the world, which in all such situations must be considerably elevated, to allow a descent for the water to run off, or otherwise it must form lakes, &c. But here is an elevation of a track of country, as Mr. Kirwan says, of 500 miles, from north to south, and 1500 from east to west, which is not equalled in any other part of the world. This we will find to be a great cause of the coldness of the eastern parts of Asia, &c. So that in the mountainous country of Boutan, the English ambassadors, who have gone from Calcutta, to the court of the Grand Lama, found severe frosty weather in lat.  $28^{\circ} 0$ , in the

month of September ; so that in ascending a few miles, they changed the burning heats of Bengall, for a continued frost. When air is very clear, the solar rays extricate no heat from it ; and when much rarefied, it retains very little heat, for the focus of a burning lens, or a mirror, causes no heat in the air, if it meet no other resistance from an opaque body ; hence the coldness of elevated situations ; this may be one reason for the temperature of the air on the western part of Europe, for it is more opaque, hazy, and cloudy, than any other place we know, the banks of Newfoundland excepted. In the production of which last phenomena, the gulf stream meeting with, and being opposed by the cold stream, or current from the coast of Labradore, together with the cold air with which it is accompanied, is a very evident cause, as the evaporation from warm water is always most visible in a cold air ; the meeting of these two currents here, is also a probable cause of the formation of these banks, and of the immense quantities of fish, with which they abound ; for where currents are stopped, they commonly deposit sediments, as may be observed at the mouths of all great and rapid rivers ; and these are always well supplied with fish, for there they find their food in smaller fishes, or insects. With respect to temperature, it is to be observed that Europe differs more from every other part of the world, than America does ; for there are other countries in the same latitudes, as cold as any part of the United States ; as China, Corea, and Tartary ; which are similarly situated, with respect to the continents, and the ocean. But the western part of America, which is similarly situated with respect to Europe, or on the western side of the continent, although approaching much nearer to it in temperature, than any other part of the world : so far as to about  $50^{\circ}$  N. where the Pacific ocean retains its breadth ; yet it is considerably colder than Europe, even there, as we may judge from the imperfect accounts, which we have from navigators. But to find the standard temperature of the ocean, uninfluenced by land, by currents, or winds.—The great South Sea, and the Pacific ocean, would certainly give the fairest estimate, and even there, the south-

ern parts of America, towards Cape Horn, are rigorously cold at  $50^{\circ}$  S. lat. in the winter, and so are all the islands, even as low as  $40^{\circ}$  S. as Van Diemen's land, New-Zealand, &c. and at Cape Horn, lat.  $57^{\circ}$  the cold is excessive in their winters, and only tolerable in summer. After repeated trials, all round the polar circle, Capt. Cook could only in one place S. W. from Cape Horn, penetrate above  $70^{\circ}$  of lat. in the same latitude in which he was flopped to the northward of the strait which separates Asia from America; this shews a great similarity in the temperature of the northern extremity of the Pacific, and the Southern Ocean. But why the eastern side of the Atlantic, and the neighbouring part of the continent and islands of Europe, should be as warm  $10^{\circ}$  or  $15^{\circ}$  farther north, remains yet to be explained. The northern part of the Atlantic is navigable to  $81^{\circ}$  or  $82^{\circ}$  every year; and the continent of Europe is inhabitable to  $70^{\circ}$  north; for there is a town in Lapland, and no doubt some agriculture, in the Swedish territories, very near that latitude, and several in Norway, beyond it, where they have several weeks of night, and as long of day, yearly.

We have already traced the trade winds, and the great prevalent currents which are caused by them, particularly that most remarkable of all currents, the Gulf Stream.—Although we have traced the strong western winds which prevail in the temperate zone, we have not yet investigated their effects on the temperature of the land or sea, or the currents of the ocean, &c. These winds are found to prevail in both hemispheres, especially in their respective winters, every where above  $35^{\circ}$  of lat. north and south; and as it is known that winds always carry a part of the temperature of the countries, over which they have passed along with them; they also direct the currents of the ocean, and elevate the water of lakes, bays, or seas, on those shores towards which they blow.

We are next to examine their effects, and endeavour to trace their laws; but their causes we cannot yet investigate—these we shall leave, until farther examination, with the Author of all natural causes and effects. There is a remarkable difference in several respects to be



observed, between the two sides of the Atlantic; we have never seen, or heard of any masses of sea-ice on the coasts of Europe, but winds which prevail in the polar regions, aided by currents which set in the same directions, along the coasts of Greenland, and from Davis's and Hudson's straits, carry large masses of ice with them, which every year, in the spring, and early part of the summer, are observed in numbers setting to the southward, with a current along the coasts of Labradore and Newfoundland; and diffusing a severe coldness to great distances about them. But as Newfoundland projects considerably from the continent, and forms an angle with the direction of it, north and south, they are not found near the coasts any farther to the southward; we find their effects however very evidently, every year in the northern states, and even so far to the southward as N. Carolina; for it is observed yearly in the spring that the N. E. winds are remarkably cold and moist, and the air very dense, cloudy and hazy: all the old inhabitants of the maritime parts of the country, are well acquainted with this circumstance; and strangers soon learn to remark it, from its very uncommon appearances. Something similar often happens in Iceland, in the spring of the year, but to a much greater degree; for there, when the ice arrives in great quantities, their cattle are sometimes starved, through want of food, as well as by the excessive coldness which is diffused all over the island; and the white bears, which live on the ice, and on Greenland, arrive in great numbers, and destroy their sheep, and cattle, until the inhabitants kill them; but this does not happen every year, even in Iceland—these vast masses of ice, not arriving in equal quantities every year, although it is but little more than 100 miles from Greenland, in one part, about  $66^{\circ}$  N. lat. But what is most remarkable is, that although the ice floats down the western parts of the Atlantic, so far as lat.  $42^{\circ}$  in some years; yet it is never observed to take its course along any part of the coast of Europe: for we never have had any information of its being seen, even on the coasts of Norway. But if we cannot find the reasons for these phenomena, immediately in the winds; we hope to be able to

find them in the currents, of which the winds are the active causes.

If we will turn our attention to the eastern sides of the two northern continents, we shall find an amazing similarity in their temperatures; for even at Canton,  $23^{\circ} 20'$  N. lat. We well remember the pinching cold of January, and every one who has been there in the winter, must have remarked the same. On considering the similar situations of China, and the United States, with regard to their respective continents; we consequently supposed that there must be some general cause for this similarity, if we could only find it out; but this cannot be caused by woodiness, or want of cultivation; for no country in the world is better cultivated, or contains less wood than China, which extends upwards of 1000 miles to the north of Canton, the direction in which the coldest winds come: for there is not wood enough for domestic purposes; and even Tartary, although not well cultivated, is by no means a woody country, by the accounts we have of it; Kamschatka is in the same latitude with part of Newfoundland,  $50^{\circ}$  N. and the similarity in the climate, and productions, are remarkable, even to the dogs, for beasts of burthen, because they cannot afford vegetables, for larger animals, as horses, or bullocks, &c. for these dogs live chiefly on fish, &c. in both countries; and many other customs, as remarked in Cook's voyage, are common to both of them; so that there is a very great similarity of temperature between the two countries: and Corea is very similar to N. England; and eastern Tartary to Nova-Scotia, Canada, and Labradore. And in short, all along the eastern parts of both these continents, they are amazingly similar in their respective temperatures.

And again, if we direct our attention to the western sides, of both these continents, we shall there also find a remarkable similarity, so far as to about  $50^{\circ}$  N. lat. or there about; or so far at least as the Pacific ocean preserves its breadth; for even here, it is narrower than the Atlantic, as 1300, is to 1500 miles. Although to the southward of this, the Pacific is much the widest, but to the northward, it contracts rapidly, about  $55^{\circ}$  N. and at

60° it takes the form of a strait, which at 66° is only 14 leagues over, from Asia to America: here, and indeed almost all to the north of 60° we cannot expect any great difference of temperature, between the two sides of this sea; but the Atlantic keeps broad and open, so far as we know, and perhaps to the pole; and is not less than 700 miles wide, in any place. This must have considerable influence; but we are to remember, that in the Antarctic seas, although we know of no continents, &c. yet they cannot be penetrated, farther than the 71st degree of latitude, but the Atlantic to the 82d; so that we must find some other reason than the breadth of the sea, or the absence of land alone. When Capt. Cook was at Nootka Sound, he, and others of his companions, were struck with the mildness of the climate, when compared with the eastern side of the same continent; and Capt. Cook was well acquainted with the opposite coasts of Labradore, and Newfoundland, for he had been several summers on that station, and drew charts of the coasts.

We come again to take a view of the currents, in the northern parts of the ocean, their causes and effects on the temperature of different countries; but in the first place, we must recapitulate those currents caused by the trade winds, and their effects in various places. These winds prevailing all round the globe, cause currents in the ocean, which extends, as we have shewn, in many parts, far beyond the limits of the winds; for they prevail near many coasts, where the trade wind never reaches, both to the southward and northward; now in consequence of the winds, in the Indian ocean, there is a constant current, sets past the Cape of Good Hope, and the southern parts of Africa, from east to west; for the trade winds in the Pacific ocean, sets the surface of it in motion to the westward; so that between the southern part of the continent of Asia, and the main land of New Holland, there is a constant current sets to the westward through the eastern islands; but it is stronger both here, and on the southern part of Africa, at some times of the year, than at others; but never prevails in the opposite direction from west to east; but from India, towards



Africa, there is always a flow current, within the limits of the trade winds; and at the Cape it often runs rapidly, even against strong storms from the westward; for in this direction we have been carried past the Cape, at the rate of two miles an hour, against the wind, when lying to, which is a clear proof of the force of the steady trade winds against uncertain storms, &c.

From the Cape, towards the island of St. Helena, there is always a current, which is one reason, why that island is often past, or overshot in the night. By this course the waters of the Indian ocean find their way into the Atlantic; but the trade wind prevailing here also, sets the waters of the Atlantic in motion to the westward; or from the coasts of Africa, towards America, where being intercepted in their course, that part which is to the southward of Cape St. Augustine, in Brasil, about the ninth degree of south latitude, is divided by this most eastern part of America; that part which is to the south of this takes its course southwardly, along the eastern coast of South-America, all along which it has been traced, and even through the straits of Magellan, and into the South Sea, and probably past Cape Horn. But that part of the current of the Atlantic, which is northward of Cape St. Augustine, is totally intercepted by the American continent, and by the direction in which the continent is, the current takes its course towards the gulf of Mexico, where it is in a manner dammed up by the continent of North America, stopping its progress to the north-west, and the trade wind behind, forcing it forward. Here we may observe that there can be no doubt but the water of the gulf is several yards higher than that of the South Sea; and that the water of the Red Sea, is also higher than that of the Mediterranean; upon similar principles: the water being forced in that direction from the east; but this was a prevailing opinion, in very ancient times.

The direction of the western coast of Africa, would seem to direct the current of the Atlantic towards the gulf of Mexico, also; where being pent up, it has no other way left to escape but past Cape Florida, between which and the island of Cuba, it forces its way; and having

passed this cape, it bends its course to the northward, between Florida and the Bahama islands, from whence it stands on, to the northward, along the southern parts of the United States, from whence it takes a north-east direction, until it vanishes about lat.  $42^{\circ}$  N. towards the banks of Newfoundland, there is no doubt but it is a very great cause of the fogs which prevail on these banks; together with the cold air which it commonly meets with here; as also another current which sets southwardly, along the coasts of Greenland and Labradore, from Davis's and Hudson's straits, &c. and both will certainly co-operate in causing the uncommon fogs met with here. These two currents intercepting each other, are supposed with great probability, to accumulate the subsistence for the immense numbers of fish, which are found here, in the same manner as banks are formed; and large quantities of fish are found at the mouths of all great rivers, where their currents are intercepted by the sea, &c.

Although the Gulf Stream runs in some of its most rapid parts, between the Bahama Islands and Florida, between two and three miles an hour, to the northward of that strait, it runs slower, and spreads wider, to about 40 or 50 miles. It is very evident that this water forcing its way from a warm to a colder climate, will carry much of its heat with it, into the colder parts of the Atlantic, as has been satisfactorily proved by Dr. Blagden; and although a part of it which is most southwardly, and in which that substance called the gulf weed floats, returns again to the southward, and performs a circular course back again into the gulf; yet the far greatest part of it takes a different course, and is driven by the west winds towards the northern coasts of Europe; for there are seeds of vegetables found yearly on the western islands of Scotland and Ireland, which are produced in the West-Indies alone; which is a convincing proof that the waters of the Gulf Stream also take their course in that direction, and we shall find that they have a great share in moderating the coldness of the European winters, but particularly in preserving the mild temperature of the northern parts of the Atlantic, which is clear of ice upwards of  $10^{\circ}$  farther

towards the pole, than any other ocean or sea in the world ; for here are two phenomena, with which we are acquainted, not found in any other part of the world—the gulf stream, and the mild temperature of the Atlantic : for we shall find on investigation, that a current sets to the northward, along the western coasts of Ireland and Britain, towards Norway, and the North Cape, and by this means preserves the warmth of these seas ; so that Europe is under many more obligations to America, for her mild winters, than it was formerly thought she was : particularly to the isthmus of Panama. But how it happens, that the gulf weed should so universally take its way to the southward, is another consideration.—It may be impelled by a law of the motions of substances floating on water, similar to that which we often see takes place in rivers, or other streams of water, wherein the lighter floating substances are collected together ; but however it is brought about, it is certain that the Gulf Stream, aided by another circumstance which we are to mention presently, is the cause of the temperature of the north-east part of the Atlantic, being so very mild above all other seas in similar latitudes. This is a phenomena which has scarce ever been attempted to be explained ; but we have no doubt but this explication will prove satisfactory ; for although cultivation has been allowed, to make the temperature of the land milder in Europe, yet that was never even suggested to extend its influence far into the ocean.

The Atlantic, we see, keeps broad and bold, quite away to the north pole perhaps, or to eighty one ; as it has been explored so far by the whale fishers ; whereas the Pacific ocean is contracted at about  $66^{\circ}$ .  $0'$ . north, to a narrow strait of fourteen leagues between the continents of Asia, and America. Now let us begin our course with the west winds in the Atlantic, where these winds are rendered mild, by passing over this great body of fluid water, and receiving part of its heat, from the agitation which it causes in the ocean, for it comes upon the British isles, as mild as it left the great ocean ; so that they have the mildest winters of any, and next the continent of Europe, which is so mild as to be habitable to near  $70^{\circ}$ .  $0'$ . north, and

fertile countries, and populous, with large cities to above 60. 0°. this must be from its vicinity, to the western breezes of the Atlantic; now these winds hold on their course to Siberia, and all that northern country of Tartary: But China being on the very eastern side of the old continent; the west winds must pass all over the continent of Europe, and Asia, before they can reach it; and are therefore much cooled by the frozen regions of great extent, over which they pass, as this is the greatest body of land in the world; of course, the rigor must be increased in proportion, from the causes we have already mentioned, and therefore the east side of the old continent, is so very cold, as to be scarce habitable to 50°. 0. north. As the countries to the northward of Corea and Kamschatka, and all along the east side of the continent, are as cold in the winter, as it is in similar latitudes, in the eastern side of the new continent, and somewhat more so; for the Empire of China is much colder, than the same latitudes in the United States of America. At the city of Pekin, the cold of their winters are greater than these of Philadelphia; and so likewise are the heats of their summers, greater at Pekin; so that both extremes are greater. In the same parallel the colds and heats are both greater, where they may be less influenced by the sea, and its temperature, in the interior parts of the old continent, the winters are as cold at Canton, latitude 23, 20. as at Charleston, lat. 32° 45'.

It is known to be very cold in Siberia, but it is a very elevated situation, of great extent; the winds of this country are thought to cool their neighbourhood; particularly to the eastward of them for a great extent, by reason of the most general prevalence of west winds, in all high latitudes, in their respective winters; indeed the interior parts of all continents are generally the highest, and of course the coolest, unless covered with lakes, &c. for as they recede from the sea, they must of necessity rise higher to give a sufficient degree of fall to rivers, to discharge their waters.

Let us again begin with the western winds, on the old continent, and follow their course, and trace their effects,

from west to east, all round the northern hemisphere; they approach the western coasts of Europe, from the Atlantic, mild and temperate, but as they advance, continuing their course to the eastward, over the continent; the western winds being more prevalent than any other; towards Asia, they become more rigorous, from the extent of elevated and frozen countries over which they pass, even in the same parallels of latitude, partaking more of the cold of winter, the farther they continue their course over the land, by which means, besides the elevation of the interior, middle, and eastern parts of the continent; the difference becomes the more perceptible, the more we advance to the eastward; and by the time it has reached the Asiatic part of the continent, its temperature is found to be much changed, as we learn from those who have resided at Moscow, and other parts in Russia. Now it continues on its course across the northern parts of Asia, still increasing in its coldness, until at Siberia, and the Tartar countries southward of it, it meets with a very elevated country, in the middle of the greatest continent on the earth, and consequently, far from the seas, either east or west of it; and here all the known causes of coldness concurring; we find of course the greatest cold hitherto known in the world, so as to congeal mercury in the open air, which requires  $39^{\circ}$ . below 0. on Fahrenheit's scale; that is  $71^{\circ}$ . below the freezing point. These cold western winds still continuing their course, for by far the greatest part of the winters, to the eastward they carry part of this excessive cold along with them, and thereby cause the great coldness observed on the eastern parts of Asia; and according to Mr. Kirwan, a few days prevalence of a north east wind, even in England, in the winter, often causes an extreme cold there, from the same source; for in the course of three days, it may travel from Siberia, to England, at the rate of 30 miles an hour, so that was the wind in these latitudes, to be as much from the east, as it is from the west, the western parts of Europe, would be rather colder than the eastern side of North America—And eastern winds of some weeks continuance in winter have sometimes caused excessive hard frosts on the western



coasts of Europe, and in Britain, and Ireland. But to return to our subject.

All the eastern parts of Asia, even to the southern extremities of China, being cooled by these winds, even Japan, is affected by them; the difference between the temperature of the winters in Canton, and Charleston, (South Carolina) is in general but very small in comparison of their difference of latitude, as the author has experienced; but altogether there appears to be a very great similarity in their temperature, and the sudden changes of the weather, especially in Autumn; between China and the United States; but to the southward of  $50^{\circ}$ . north latitude, the Pacific ocean becomes very wide, and of course the winds lose much of their coldness in passing over it; and the western coast of America enjoys a considerable temperature from that to the southward; but to the northward it is more cold in proportion, especially about the straits in  $65^{\circ}$ . N. lat. but so far as Cook's river, in  $60^{\circ}$ . it is certainly not so cold as the opposite coasts of Asia, or the east coast of America, for there Captain Cook repaired his vessel, and there is mention made of cutting down timber on shore, which would be difficult to find on the eastern sides of either continent, in that latitude; and at Nootka-Sound, they found abundance of vegetation, &c. even in lat.  $50^{\circ}$ . but about the straits, between the continents the temperatures cannot be very different on either side, although it is different, from  $60^{\circ}$ . to the southward. And the west winds progressing on along the northern part of the American continent, passes over that large and unknown track, to the westward of Hudson's bay; and the lakes again traverse a high, mountainous and marshy country, but a little inferior to that of Siberia, for coldness, so that by the time it approaches this bay, and the north-western lakes, &c. its coldness is again excessive, so that Mr. Andrew Ellicot, in his late expedition as commissioner, to determine the Spanish boundary, found it for several days together, with a north west wind, from  $4^{\circ}$ . to  $7\frac{1}{2}^{\circ}$ . on Fahrenheit's Thermometer, at the junction of the Ohio and Mississippi, in latitude  $37^{\circ}$ . but the western wind passing on towards the Atlantic states, loses some-



thing of its severity in passing over the great lakes, which are so large as not to be sufficiently cooled to freeze by the continuance of any one winter, only about their borders, and the straits between them; which although it is very cold in the northern parts of the United States, would certainly be much more so, did not these large bodies of water intervene to the north west. So that in the United States, the north west winds are the coldest in winter, and all winds from the north to the west are remarkably cold, but nevertheless there are other parts of the world, particularly in the south eastern parts of Asia, as in Boutan, and China, much colder in the same latitudes, and certainly more so in eastern Tartary.

Now we are to trace the western winds of the winter season, across the Atlantic, where they are most generally known to prevail, by reason of ships from America, commonly making their passage to Europe, in one half the time that they are in returning. The north western winds are well known to navigators on the coast of North America, but they become milder the farther from the coasts; so that by the time they arrive on the coasts of Britain, and Ireland, they are by far the mildest winds in the world, in such high latitudes, as these islands, particularly; and the neighbouring countries, exceed every other, in such high latitudes, in the mild temperature of their winters, although they are all upwards of  $50^{\circ}$ . north, they are much milder than many others are at  $40^{\circ}$ . A part of this extraordinary phenomena, must be attributed to the Gulf Stream, which certainly contributes also to the warmth of the Southern States of America, so far as  $35^{\circ}$ . north, and carries its heat with it far north into the Atlantic; for when it meets the northern current, at the Banks of Newfoundland, it is turned to the eastward; this is demonstrated every year by its carrying the seeds of vegetables with it, which are only produced in the West India Islands; and are found yearly cast on shore, on the western isles of Scotland, and other parts; for although part of the Gulf Stream, and sea-weed, perform a circular course, and return to the West Indies, the greatest part of the water of it appears

to take the northern direction, and contributes to form a current of warm water along the western coast of Ireland, and Scotland, and from thence to Norway, which extends to latitude  $71^{\circ}$ . and is inhabited thereto; and is lost in the North Sea, which it is the only probable cause for preserving navigable to  $81^{\circ}$  or  $82^{\circ}$ . of latitude, and to it also, there cannot be any doubt that Europe is in a great measure obliged for the mildness of her winters, for the Gulf Stream, has no equal in the other parts of the world, nor has Europe any equal in the temperature of her winters; but this deduction is, we hope, sufficiently founded on facts; and the more of them we collect, the firmer it appears to be supported.

Now we have finished a survey of the globe, and remarked the various causes, of either cold or heat on its surface, it may be agreeable to our readers to have a concluding recapitulation of the different causes already stated, with their consequences.

We hope it will be granted that the defect of numerous inhabitants, and consequently want of cultivation, and the great quantities of woods, cannot be the cause of the coldness of the winters; and the lakes which have been assigned as being necessary to the coldness, must on the contrary, be allowed to be the very reverse; and as for the height of the mountains, or of the surface of the continent of North America, it does not appear to be considerably higher above the surface of the ocean, than that of Europe. But even allowing that any of these reasons were of some importance, we have, on comparisons with other parts of the world, it is hoped, given satisfactory reasons for their insufficiency, to produce the great difference between the temperatures of Europe and America, in particular; and that other causes were to be sought in order to carry conviction; and these we have endeavoured to find, in the prevalent winds, and in the currents of the ocean, of which the winds are the cause.

As to the trade winds they are generally known, and the currents caused by them have been often taken partial notice of; the Gulf Stream in particular, is so very remarkable as not to escape attention; but the prevalent

northern winds, and currents, have not been so generally attended to. Although we find them very material causes of the difference of temperature, which prevails between the eastern and the western sides of the Atlantic, in its northern parts, and also in the Pacific Ocean, in a less degree; and likewise the difference in the temperature, between the east and west sides of the northern part of the old continent; they being as different, as the two sides of the Atlantic; and the east and west sides of North America, differ as much as those of the Pacific Ocean, do from one another.

In these we have deduced the reasons for all the varieties of temperatures, and we have also endeavoured to prove that the temperature of Europe, and that of the Atlantic, in its neighbourhood, is peculiar to that part of the world, no other in similar latitudes, enjoying a temperature so mild, although the western side of the American continent, comes the nearest to it, in this respect. We have investigated the reasons for their agreement, and also those for their difference; the first being in the similarity of their situations, with respect to the continents, but the other in the respective differences of their neighbouring oceans, as to breadths and currents: their temperatures in their eastern parts, differing very considerably from each other.

The southern hemisphere we consider as affording the most regular standard of heat, or cold, for the different latitudes, as it is the least interrupted by land, or currents: and there we find the boundary of perpetual frost, in as low latitudes as in the northern part of the Pacific, neither of which have been penetrated beyond  $72^{\circ}$ . lat. but the Atlantic is commonly navigable to latitude  $81^{\circ}$ . and it is the only part of the world, where there are navigable seas to be found in such high latitudes. We are accordingly led to investigate the causes of this difference, which appears so great and obvious, between this part of the Atlantic, and every other sea hitherto known. The temperature of the European Seas, we find to correspond with that of the continent, and the islands in their neighbourhood, and both to be derived from the same sources,

viz. prevalent winds and currents ; the number of inhabitants, or the progress of cultivation, which together with the clearing of the countries, must be in proportion to the mildness, or the severity of the climate, and of course, it is rather a consequence, than a cause of the mildness of Europe. But we have also adduced sufficient proofs, that the temperature of these opposite countries is not confined to the land only, but that it prevails out at sea also, many hundreds of miles from the coasts.

We have also demonstrated from the premises, that the breadth of the American continent to the northward, cannot be a cause of great coldness, for in the same latitudes in other parts of the world, Europe alone, excepted, there is a perpetual ice ; and whether the surface of the globe, is covered with mountains of ice, or of land, is but a matter of indifference, in respect to the temperature, unless what is the effect of elevation : neither can the narrowness of North America, in the warm latitudes, be any probable cause of the coldness of the winters, for it does not even cause any defect of heat in summer ; and although most part of South America is within the tropics, yet its southern extremity is so cold, as to be scarcely inhabitable, or capable of cultivation, farther to the south, than North America, is to the northward, that being to about  $45^{\circ}$ . or  $50^{\circ}$ . Although there the extent of land from east to west, is only three or four hundred miles, and no other land near it in either of these directions, and but little to the southward of it ; so that this would appear to be a good place, to fix a standard temperature for land, we must acknowledge that the great chain of the Cordillera mountains, causes a coldness to the east of them in high latitudes particularly, as they do in the northern hemisphere ; but we know that the influence of mountains does not often extend very far, especially to the northward, or southward of them, the wind not being often constant in those directions : in high latitudes Mr. Kirwan remarked, that it was always colder to the eastward of mountains. The burning heat of Bengal, are within one degree of the pinching cold country of Tibet. But the southern hemisphere, in general, from latitude  $35^{\circ}$ . towards the poles, appears

to be colder than any part of Europe, but very nearly the same as the east coast of North America; but it would appear that the northern, and southern parts of the west coast of America, also, resemble each other in their respective temperatures; but if there are any difference the northern may be the mildest, by all the accounts we have of them; the southern part of New Holland, and New Zealand, also, are very cold, in comparison with similar latitudes, and insular situations in Europe; but very near the same as in all other parts of the world, respectively.

With respect to the temperature of different climates, we hope that sufficient reasons have been given, every part of which is the product of experience, and may be found confirmed, in the most authentic accounts of late voyages and travels. Europe appears to differ in its temperature, from all other parts of the world; that which appears nearest to it, is the western coast of North America; but all other parts of the world, appear to agree amongst themselves. The European side of the Atlantic ocean, is similar in temperature to the neighbouring countries, but different from all other seas in similar latitudes; so that the mildness of the European winters is not to be expected in any other part of the world, in such high latitudes; and this we have endeavoured to prove, is not owing to accidental but to permanent physical causes, and does not depend on the numbers, or the industry of the inhabitants; or if it did, China should far exceed it in the mildness of the winters.

We may now turn our attention to the extent of the change, which the climate of any country may undergo, from the increase of the number of inhabitants, and consequently of cultivation. This may form another subject of investigation, although closely connected with the former. On this subject, it may be remarked, that we have no accurate registers of the temperature, of the ancient countries—their estimates being made according to their sensations; so that we must depend on other circumstances, for our estimates of it, and we may observe also that we are very apt to be deceived by exaggerations. Dr.



Williamson, and the Abbe Man, are the only writers who have hitherto fell under our notice on this subject; the latter follows the former in every particular, but collects a great many more passages from the ancients, in confirmation of the coldness of the winters, in every part to the northward of  $44^{\circ}$  being as rigorous as it is at present in Norway, Lapland, and Hudson's Bay: but neither of their accounts appears to take notice of the warmth of the Atlantic; but notwithstanding all the surmises taken from the exaggerated accounts of poets, and others, who are very apt to attend only to the extremes, in their relations, respecting other countries; if we are to form our judgment of the temperature of the shores of the Baltic, from the number of inhabitants, and of cattle, which these countries supported in very early ages, the inhabitants of which appear to have had large flocks of cattle; those countries which produced the numerous hoards, of the Vandals and Goths, were certainly very populous, long before we have any historical accounts of them; for so noted were the shores of the Baltic, for producing inhabitants, that they were proverbially named the *officina gentium*, or the *manufactory of nations*; very different from the countries about Hudson's Bay, at any time, &c.

But although the effects of cultivation, and the number of inhabitants, of fires, and domestic animals, in ameliorating the climate of any country, must be allowed its due weight, yet we have no reason to think, that it could produce any such difference, as exists between Europe, and every other part of the world. Even from the S. W. coast of America, which comes nearest to it in temperature. The cultivation of China has produced no alteration, so far as we can learn, in the temperature of the most south-eastern part of the empire, although its extent from thence to the north-west, is upwards of 1000 miles. It is true, both vegetables, and animals can be accommodated to a colder temperature, than their native climates, by habitual use; but although vegetables can be habituated to a colder climate, than their native countries, that is no proof of the increasing mildness of the weather. Dr. Barton, who appears to have employed much search and

consideration on the subject of transplanting, and habituating of vegetables to colder climates, than those where they have been spontaneously produced; thinks, that he has sufficient documents to prove, that there are few plants which may not be habituated to any climate, without any change taking place in the temperatures; so that this is no proof of a change. The idea of the increasing mildness of the weather in Europe, has commonly been attached to that of its comparative mildness at present, when compared with other countries situated equally distant from the equator, either north or south; the one subject of investigation, is certainly closely connected with the other; but we are at the same time, fully convinced that the difference of temperature, between Europe, and other quarters of the world, does not depend on this circumstance alone. It was very natural for Europeans, on their first coming to North-America, to exaggerate in their accounts of the coldness of the winters, because they had been used to very mild ones at home; and although it is highly probable, that some small changes have taken place in the neighbourhood of the Delaware, or Hudson's River in America; yet from the most authentic accounts, which we can collect, it is not much changed, either here, or any other place, to the northward, or southward of this; for all the large rivers so far south as James's river, are often frozen, and it has been frozen down to City Point of late years; but clearing of woods, and cultivation, can only act partially, and be of partial advantage in any country: clearing makes way for the sun to act on the surface of the earth more freely; whereby some heat may be extricated, which may be a mean, as suggested, of moderating the coldness of the winters; but it should also be remembered, that when the ground is cleared and cultivated, it is not left totally without defence against the sun's rays, which are sources of heat, as well as light, for vegetable productions of various species, are cultivated, which serve as a partial defence for it. Wet summers also have been said to be succeeded by cold winters; but was the cold of the winters to depend on the quantity of rain which falls, and of cloudy hazy weather, Ireland and Britain, should be the

most frosty and cold, as they are the most rainy countries we know of; for certainly these, which are by far the mildest of all countries in the world, with respect to their latitudes, do not depend upon the rays of the sun, in any time of the year for it; for we believe there are scarcely any other parts of the world, which enjoy less of them, than these European islands; so that from all the information we are able to collect on this subject, the causes of the mild temperature of Europe, is not accidental, or dependent on the superior cultivation, or the number of inhabitants, which are actual consequences of the original mildness of the climate; for we have no reason to doubt, but that the causes of this mildness, are to be traced to innate physical principles, which have been in action ever since the formation of the world; or at least since it assumed its present form: and these principles we have already endeavoured to trace, from the prevalent winds, and currents of the ocean. Perhaps tracing the subject farther, would be more to the taste of some of our readers; but the present essay was the result of the amusement of some hours of relaxation, from more abstruse studies—If it meets with that approbation from the world, which it has already in part received, from one philosophical body, the subject may be prosecuted to a greater extent in future; as this is only offered as a specimen, of what may be considered a new mode of investigation in physical geography; a subject, which certainly deserves more attention than has hitherto been paid to it.

But as the wise laws of Providence have impelled the author, through curiosity, or from other motives, to visit many different climates, and countries, and as his employment has always afforded him time and opportunity, for both observation, and reflection, he thought proper to embrace such opportunities, as his situation offered. From it, he hopes that some information will be derived, both to the adventurous, and also to those who are curiously fond of inquiries of this nature.

*The Physical Effects of Heat, and Cold, and their reciprocal changes on the Human Body.*

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PRACTICAL writers have commonly taken notice of the succession of diseases, with the course of the seasons, but we are to observe, that these are very rarely the simple, or uncombined effects of the changes of the temperature alone; but together with these, we have to observe those effects produced by various miasmata, and effluvia, and also specific infections, there is some difficulty in separating these concomitant causes of diseases, which occur from all those various sources, from those of a more simple origin.— Therefore it is requisite that we should examine those different causes of diseases, in various situations, and points of view, in order to discriminate them with the more accuracy. For this purpose, attending to their causes, and progress, in various places, is indispensably requisite; and also, in various climates, and local situations on land, but more more especially at sea, where we certainly have the atmosphere less combined, than it ever is on land, even in the most healthy countries.

In the consideration of this subject, we mean to attend to the simple effects of a warm atmosphere, and their consequences, separate from the impregnations which it often undergoes. Wonderful as it may appear to any person, on first turning their attention to this subject, there is very little information to be found on it, in any writings extant, hitherto; although winter, and summer have been alternately succeeding each other, in all ages, in the temperature climates, where the most diligent observers have resided. But since the art of navigation has been brought to its present degree of perfection, within the last three centuries, we have opportunities of observing a species of artificial, or experimental changes, with their effects; and

as in other departments of physic, the method of experiment, is often the best means of becoming acquainted with the common, and regular course of the properties, principles, and laws of nature; so likewise in this, we may hope by changes of climate, and local situation, to acquire some information, which a stationary residence in one place would not so readily afford; because we are so very apt to overlook those circumstances, which we have been always used to observe, recurring regularly: as we may every day see miracles, without attending to them, only because they are common.

Hippocrates paid much attention to the vicissitudes of the seasons, but the physical knowledge of nature, was so very little understood in his time, that although his diligence was great, and his sagacious attention, to whatever fell under his own observation so accurate, as to appear wonderful; especially when we consider, that there was scarce any thing wrote on the subject before him, of greater magnitude than tablets, or accidental recipes; and a very little which was to be found, in the works of the few Grecian philosophers, who preceded him. We are not therefore to expect from him, what the times could not afford; although he travelled much in Greece, and Asia, yet his observations on the winds, are mostly of a local nature, and applicable only to those situations in which he observed them; for as winds always partake of the properties of the countries, or districts over which they have last past; and consequently, if the country is high, mountainous, and cold, the winds will be cold and healthy; but if they pass over a low, marshy, warm country, the wind will be also warm, moist and unhealthy; if from sea, it will be more temperate in the winter, but cooler in summer, or in fact it will carry the prevalent temperature of the place with it; but when Hippocrates seen an east wind unhealthy, in one or two parts, he applied it to all east winds, and many of his latter successors have followed him in his errors, and oversights.

Had a rational attention been paid to the effects of heat, we should not have had the medical faculty themselves, differing in opinion concerning it, down to the close of the



eighteenth century, some contending for its stimulant, and others for its sedative effects. This would appear wonderful, did we not consider, that on all subjects there are men of various talents, whose diligence and information differ, in proportion to their acquisitions: and every one supposes himself right, and others wrong. Besides, many men of abilities often have an apathy to enquiry, believing assertions, rather than seeking for proof through large works, and following others, rather than thinking for themselves.

The immediate effects of heat upon the human body, appear to be stimulant, and of all the agents in nature, we believe there are none more directly, and certainly so; but like all other stimuli, it destroys the vital principles by its excess; but in moderate quantities, it is necessary to life and health; and the total privation of it, is known to extinguish life, in the warm blooded animals; and to cause a torpor in the cold blooded: both these extremes, as well as the medium, we shall consider separately.

As it is obviously necessary, when we mention heat or cold, which are only comparative terms, that we should fix some standard to refer to. We mean to fix it at  $65^{\circ}$ , for reasons which shall be given: for although the blood of all mankind is very near the same temperature whilst in health, that is, from  $96^{\circ}$  to  $98^{\circ}$ , yet by being accustomed to various temperatures of the atmosphere, they become habituated to that, to which they are most accustomed. Sudden changes, either to a warmer or colder temperature, affects them considerably: for instance, to a person coming from within the tropics  $65^{\circ}$  will produce a sensation of coldness, because their medium heat was little under  $80^{\circ}$ ; but to a person from a high, inland, northern country, especially after the winter, this medium will appear rather warmer than they would wish; because their temperature for some months, has scarce rose so high as  $40^{\circ}$ : it is to be remarked however, that the young and strong bear cold much better than the aged, weak, and thin; consequently these latter would bear warm climates better than those in the vigor of youth; and so also do youths before they arrive at maturity, and women in general, bear

warm climates better than men; but their habits of life, as well as their more delicate temperaments, appear to be much in their favour, in this respect; for the stimulus of heat, added to constitutions full of vital energy, inherent strength, and full vessels causes inflammatory affections.

The standard has been fixed at  $62^{\circ}$ ; but this was by accommodating it to the northern parts of Europe, which are by no means in the middle of inhabitable latitudes; but in order to accommodate it to those who bear the tropical heats  $65^{\circ}$  would be nearer the medium. For a mean of latitudes where the temperature would be most agreeable to the human sensations, as well as to animal life, it would appear to us, from a survey of the globe, that from  $40^{\circ}$  to  $55^{\circ}$  in Europe, and from  $30^{\circ}$  to  $45^{\circ}$  in other parts of the world, would be the most agreeable residences for mankind; but as elevation may cause great differences in the respective temperatures of places; we mean such situations, as are not considerably elevated above the surface of the ocean, and near sea coasts. The N. West coast of America, we believe comes more near the European temperature, than any other part of the world, and there we might fix the most agreeable medium, from  $35^{\circ}$  to  $50^{\circ}$  all below these limits being over warm, and all above too cold, for agreeable habitations; but elevation, soil, vegetation, &c. cause great varieties in this respect, as we have already observed; so that the elevation is a matter of far greater consequence, than the latitude, with respect to the temperature. But the connexion, and effects of these circumstances, with the physical state of man, his diseases and remedies, we shall endeavor to trace out, in their most obvious relations and prominent parts.

The stimulant effects of heat, are very similar to those produced by other stimuli. On its first application, when moderate, it exhilarates, and enlivens the animal spirits, much the same as spirituous liquors, &c. as may be observed annually, on the accession of warm weather, in all high latitudes, or still more visibly, in sailing from cold northern countries, to the warm climates; and this effect continues in part, although it loses some of its action by a long continuance; because it stimulates, and sets the la-

tent vital energy in action; but when it is over suddenly applied, it exhausts the vital energy too soon, and by these means, causes a depression and weakness of the body. And accordingly we see that the inhabitants of the cold northern countries, are, on their first removal to warm climates, rendered more lively and alert; but by a series of years continuance there, they generally lose much of this disposition, and especially, if they are confined to sedentary employments, in towns, &c. and the more visible will this effect appear, the warmer the weather is, independent of topical influence from situation: so that we constantly find Europeans, after a long residence in warm countries, get thin, weakly, and emaciated; although, if their situations are otherwise healthy, they still retain, or even increase in animation, although their minds seldom retain that vigor, which they had in their native countries, so that they cannot apply themselves so advantageously to abstruse studies.

The imagination being stronger than the reason or the memory, they become volatile, or sink into hypochondriacs, in case they have made over free with strong liquors; for a long residence in very warm countries, together with the additional stimuli of strong liquors, weakens the body in an extraordinary manner, and also depresses the mental faculties, especially where the mind has been in an uneasy state. Persons in such situations, are very subject to fevers from slight causes, or to hepatic (liver) affections; and we rather believe, that diseases of the liver are the most frequent causes of hypochondriac, and other such affections, after the energy is exhausted by heat and spirituous liquors. As we are fully convinced of the stimulant effects of heat, so are we also of the sedative effects of cold. Heat increases the action of the vessels, and other moving vital parts, on the surface of the body.—Cold, on the contrary, allays and assuages this action; but we are to notice, that it is only on the surface that either of them can act directly, although many of the internal parts sympathize with it; for the heat of the blood, and of the internal parts, are not perceptibly changed by the external temperature; so that all the effects of heat, are produced

on the surface, and the sympathies to which it gives origin; but even this, as we may observe, produces great changes on the system.

In consequence of the sedative effects of cold on the surface of the body, the vital energy is accumulated, and by this mean the strength is increased, unless in cases of old age, or great weakness, in which they are apt to be overcome by the first impression of cold. And in this situation, the cold acts as a permanent sedative on them: and is over strong for the vital energy to overcome: therefore old persons do not bear the cold of winter, or the colder climates, so well as the young; and from only attending to their own sensations, they complain of the general temperature being changed. But the young bear the cold better than the aged; even infants have been known to survive a cold, which has destroyed their mothers, when suckling them; an instance of which happened, not far from London, about 20 years past, in a frosty night.

The inhabitants of warm climates, on removing to colder countries, are commonly attacked with catarrhal affections, obstructions of the viscera and hypochondrias; for they are then deprived of that external stimulus to which they have been used, and especially if they are past the prime of life, and have long resided in warm climates, they are more strongly affected in this manner, than any people can be, on the accession of winter, after the hottest summer; for the summer's heat does not continue so long, nor is it so intense.

Heat, like other stimuli, when applied in moderate quantities is necessary to life and health; but an excess of it wears out, and destroys both, by keeping up too great an irritation on the surface, and other sympathizing parts of the body; but an excess of cold acts not in the same manner, but directly opposite; and the natural temperature of the atmosphere destroys life in both ways.—But sun strokes are more common than being frozen to death. On the application of cold to any part of the body, if it is not deprived of life, on coming into a warmer atmosphere, a temporary inflammation succeeds, from the



vital energy being accumulated during the action of cold, but by heat it is exhausted, and the body weakened.— But if the rays of the sun are avoided, the human constitution could bear much greater heats, than it is ever exposed to in the natural heat of any country; as we have many experiments to prove, by heating rooms as Dr. G. Fordyce did, and in glass houses, sugar refineries, &c. But a continual heat sets other causes in action, by hastening putrefaction, and it also predisposes the body to be more susceptible of morbid impressions.

A heat of about  $65^{\circ}$ . where we have fixed the medium temperature, we are much disposed to judge, would be the most agreeable for all mankind; both the physical and mental functions would, we believe, arrive at their greatest perfection in such a temperature; or suppose we allow a little more variation, as much above, as below this standard, then we may say from  $60^{\circ}$ . to  $70^{\circ}$ . and then all above this may be called warm, and all below it cold; either of which produces disagreeable sensations, which must leave their effects in the mind, and occupy some part of the attention. But the cold, although disagreeable at first, yet if it does not fall much below the medium, the mind and body are both improved by it; and a heat, a little above this, is generally agreeable at first, although it debilitates the body, and also weakens the mind, if long continued; but their alternate changes are rather agreeable than otherwise; for there is an innate fondness for variety, implanted in the human mind. As when they do not go to excess, they cause a pleasing variety; and we have much reason to conclude, that the changes contribute to the preservation of health; for as Sydenham observed, the changes preserve a balance. On this account, an over great uniformity in any of the articles of regimen, are to be avoided by those, who would wish to preserve their healths in the greatest perfection, for neither food nor drink, air nor exercise should be very uniform; otherwise they cause a great susceptibility of the body, or predispose it to be acted on by every variation of the air, or regimen, and weakens the mind, as well as the body, and deprives mankind of their true happiness.



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# SKETCHES

OF

## MEDICAL TOPOGRAPHY.

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*Mortalibus vitæ, et morborum ægrotis, ærem esse auctorem.*

*Hip. Lib. de Flat.*

IN the following sketches, we intend to collect the result of various observations, made in many parts of the world, but principally in warm climates. We do not consider this subject the less interesting at present, although the existence of marsh miasmata; and what is still more marvellous even of infectious effluvia; has of late been denied. This has been done with the more confidence, because modern chymical experiments, have not at all times been adequate to demonstrate the presence of these effluviæ. With the same propriety might the sensible properties of any other substance be denied; such as taste, smell, &c. because they cannot be demonstrated by any chymical analysis. But these properties are the immediate objects of sensation; miasmata and effluvia we can seldom discover, only by their effects.

We must confess that there has been much done in the present age, in the investigation of the operations, the principles and properties of these subjects; but much is yet to be accomplished by experiments, before we arrive at the summit of human perfection; for the field appears

to widen as we advance in it—But the application of experiments to their proper purposes, and to no other, as has too frequently happened, is an object of some utility; for most new discoveries are misapplied, and this is often the cause of their falling into neglect; the result of observations, though slow, is commonly applied to advantage sooner.

The atmosphere at sea, being unaffected by the exhalations from either vegetable, or animal decomposition, or the miasinata (exhalations) of stagnant water, must obviously appear to be the best situation to draw our inferences from, unless we were to take that of high, or mountainous countries, which is commonly sufficiently pure also.—Small islands in the ocean also enjoy a very pure air, especially where they are high and dry; and so does some large islands, and even continents, where they are free from stagnant water.

It is a remarkable difference which takes place, between an atmosphere with moisture simply diffused in it, as it often is at sea, or in high and healthy countries, and that which exhales from stagnant water, swamps or marshes; the former is seldom hurtful, whereas the latter is often pernicious. To those we shall particularly attend in the ensuing sketches.

The heat of the atmosphere, being confined very near the common level of the surface of the ocean, in all climates, appears to be a cause of the heats being so great in low countries, especially in warm climates, and consequently of the noxious exhalations, of which heat is always the active agent; the heat of any part appears to be affected by various circumstances; but it is commonly in proportion to the number of the rays of the sun, which fall in a given space, as we may prove by a lens, or mirror; therefore where they approach nearest to a perpendicular, they are the strongest: and when the air is clear; they act on the earth with the greater force. But although the light comes from the sun, the heat does not, the rays of light only extricate it from the earth; otherwise the highest mountains would be the warmest parts of the world, as they are nearest the sun.

All substances which can be dissolved, and suspended in the air, by the heat of our atmosphere, must be in part mixed with it; many substances are also volatilized, and diffused in the air by putrefaction; but processes of this nature, require a certain degree of heat, it must be above the freezing point, at least; for below it all (septic) processes are stopped.

Great heats, when accompanied by moisture, volatilize many substances, which more temperate weather will not affect; but vegetable putrefaction, or the exposure of a moist surface in the time of frost, does not change the properties of the air, for frosty weather is equally healthy in all parts of the world. The air being of all other known substances, the most necessary to life, and its variations so generally affecting our healths: It is therefore deserving of the most serious attention of the physician, as well as that of the general philosopher.

The atmosphere in general contains about three fourths of its quantity of air, in which neither animals can live, nor fire burn; this has been named mephitic (or azotic) air. The other fourth is the pure vital air (oxygen) but even the absence of the pure principle does not render it so hurtful to life, as the presence of fixed, or inflammable airs, which are commonly extricated by the decomposition of either water, or vegetable substances. It is the pure part of the air, which imparts the beautiful scarlet colour to the blood. It is also the support of the vital principle, (or its pabulum) but the fixed and inflammable airs impart a darkish, brown colour to all the red parts of the body, but particularly to the blood. Any part of the body being inflamed, it darkens the blood more than is common in circulating through it, although it acquires a dark crimson colour, always in its course through every part of the body, except in the lungs. The necessity of fresh air, about a gallon a minute, or near the same quantity, which a common candle requires, is absolutely necessary to support life, and health. By Dr. Crawford's experiments, it appears, that when the body is immersed in warm water, or warm air, the venal blood returns but little darker coloured, than the arterial blood.

is; this may serve as a proof, that heat alone is not a cause of a dark colour, when the rays of the sun are excluded from the body; but it appears to act through the intermedium of other substances. But we find some persons having very good colours, for two or three generations, in healthy islands, between the tropics, as in St. Helena, the Isle of France, &c.

The inflammable air contained in the venal blood, being the substance which principally attracts the vital air. When this is deficient, less of the vital air mixes with the blood, in the lungs, and consequently less heat is extricated; this appears to be the only explanation we can give, why the interior parts of the body and blood, are no hotter in warm, than in cold climates, or seasons.

But as a supply to the waste of pure air, which is consumed by the breathing of animals, and the burning of fuel; the growth of vegetables affords it in great quantities, when the sun shines on them, they also absorb inflammable air, as part of their nutriment; this appears to have been the design of the Creator, in their formation, and omnipotent wisdom is here conspicuous. The evaporation of water also affords pure air, so that the only large tracks of the earths surface, which are without either of these means of supply, are the sandy deserts of Arabia, and Africa, for their suffocating winds, appear to be deprived of their due proportion of these principles, as travellers often experience.

The effects of heat upon pure water, either fresh, or salt, only serve to evaporate it, and by this means to combine it with the air, for warm air always contains much water in an arial state; unless we except the Harmatan, or Sirocco winds, just mentioned; for so far as we can collect information of their physical qualities, they are remarkably dry. But the proportion of the pure principle contained in water, is found, by chymical analysis, to be much greater than it is in the atmosphere, for water contains it in the proportion of about four to one, or about 84 per cent. of (oxygen) or the principle of pure air, and the remainder is inflammable air; but the atmosphere contains only about one fourth of its quantity of pure air;

and the other three fourths, are called azotic (mephitic) air, which cannot support either animal life, nor the flame of fuel; from this consideration, the evaporation of water would appear to be a necessary part of the composition of common air, because when deprived of it, as in the Arabian winds, it becomes destructive.

Nevertheless, we find by experience, that when either warm, or cold air is overloaded with water, it is hurtful to human life and health; here living experience goes counter to what we might be led to suppose, (*a priori*) from chymical analysis; but this is not the only instance in which chymistry comes far short of demonstrating the effects which physical substances produce on animal life; for there are no states of the air, in which it is more disagreeable to our feelings, than when it is much impregnated with moisture, either in a warm, or cold state of the atmosphere, for we are weakened, and dispirited in the most evident manner, when the air is warm; and the surface of the body becomes relaxed, and our minds and bodies are both rendered languid, by its continuance; from these facts then, we would be led to believe, that moist air does not perform its office in the lungs, so well as drying air does; whether this happens by its not imparting the pure principle, together with the heat, or by its not attracting the fixed, or inflammable air from the blood, we are not yet warranted in determining from actual experiments. Cold and moist air, appears to obstruct perspiration, by rendering the surface of the body more quiescent, or lessening the action of the fine hair like (capillary) vessels of the skin; hence proceeds (catarrhal affections) or colds, and in a warm moist air, we are involved in a species of natural vapour both; and inhale the same in respiration, by which means, we become so relaxed, as to be affected by the least change in the atmosphere.— And hence proceeds dysenteries, and choleras, together with intermittent, and remittent fevers, accompanied with bilious appearances. But a dry pure air, imparts a cheerfulness, strength, and alacrity, as in frosty weather, by it we are rendered more happy for the present, and more able to resist future impressions; but pleuritic



pains, and consumptions are sometimes produced by it. But water impregnated with vegetable substances in a state of fermentation, gives out to the air, during the decomposition both fixed and inflammable air; the fixed air when it exceeds the bulk of the water, is imparted to the atmosphere, but in lesser quantities, it is absorbed by the water, the inflammable and azotic airs, it does not absorb—The water of the Thames, when carried out in ships, undergoes a fermentation as soon as it arrives in warm climates, on account of its muddiness, &c. and the vegetable extracts mixed with it; after which by the time it gets to the southern hemisphere, there is so much inflammable air extricated, as to burn with a blue flame on the application of a candle.

In consulting practical authors, a due regard should be paid to the difference of climate, between where the practitioner wrote, and that of the reader, on this account a knowledge of geography, and topography, are essentially necessary to an intelligent physician; the prevalent winds also, their heat, or coldness, moisture, or dryness, may be partly learned from the topographical descriptions of the countries, with respect to hills or plains, woods, or marshes, lakes and seas, and the nature of the soil, which the winds last pass over, forms an important part of medical science. Hippocrates appears to have paid due attention to these subjects in his observations upon air, places, and waters, which is nothing more than medical topography; but it appears since his time to have been much neglected. But as for the water which is used for cookery or for drinking, it makes but very little difference with respect to the salubrity of the place where it is used. Whether it is hard or not, as the expression is, for its qualities of not easily lathering with soap, or boiling peas, or the contrary; and if there are any material difference, hard water may be softened by exposure for some time to the air, by this means its acid will evaporate, and the selenite, or other mineral particles which it held in solution, will be deposited, or this may be more speedily effected, by mixing with it, a small quantity of lime water, or quick lime. Those who have

been used to soft river water, when they first come to use hard well water, are very apt to be disordered in their bowels by it. In my first voyage to India, being in a store ship for the Island of St. Helena, where the water is very hard, I suffered by it personally; and a number of the sailors, and recruits belonging to the East-India company, after getting the St. Helena water, were attacked with violent griping pains in their bowels, so violently that they would frequently cry out, and roll themselves about upon the decks; this affection was so common, that we remember being three times raised out of bed in the course of one night; on this account the most effectual and speedy relief was obtained, by giving immediately, a smart emetic; and as soon as the vomiting began, the pain gradually ceased, and if it returned at intervals after the operation of the emetic, a few drops of laudanum commonly cured it; notwithstanding this, the water of St. Helena is both pleasant and wholesome, to those who are used to it, after the first two or three days; it is stagnant water that endemic sickness is generally caused by: whenever they are caused by water, and not by that which is used internally; for even suppose it is drank, or used in food, with fossil particles dissolved in it, they can scarcely be capable of doing any harm, unless they are sensibly perceived by the palate, as chalybeate, or sulphureous, or other springs are; and of course they will be rejected, unless used medicinally; very cold water would appear to be best for weak stomachs, and languid habits of body; and soft water for those of an inflammatory disposition; but before any of them gets into the blood vessels, their nature is changed in the course of digestion, so that they are all much the same before they are even absorbed by the lacteals; much less can they carry their earthy particles into the bladder, and cause the stone, or gravel there, as has been very erroneously thought by old writers, and others, even to the present day. There are great allowances to be made for writers of very different climates, as well of different local situations; on this account, the writings and observations of the antient Grecians, and Romans, are not always applicable in Britain or Ireland; nor are the ob-

servations, or practice of Britain, at all times suitable to the inhabitants of North America, or the countries between the tropics; but from the similarity in climate, between Greece, and Italy, and that of the United States; we may expect a greater similarity in the progress of diseases, in these countries; they lying under the same parallels of latitudes: than between either of them and Great Britain, where the heat never is so great, as in either of them; nor the cold so great as in North America, nor the changes near so sudden, owing to its insular situation, and enjoying the temperate western breezes, from the Atlantic; on this account the Grecian, and Roman medical writings, may be read with more advantage in the United States of America, or even in the East or West Indies, than in Britain, and Ireland; for their diseases are more similar. And on the same account, we should pay more attention to the modern Italian practitioners in the United States, than in Britain, or Ireland; and find their descriptions of diseases coincide more nearly with our own. The south of France is as hot in summer about Montpelier, and Marseilles, as America is about New York, Philadelphia, and Baltimore, and the middle states in general. But although a few of the French excel in chymistry, anatomy, and operative surgery; yet for a nation so far advanced in the sciences, we hear of very few practical works produced amongst them of late: neither do the Spaniards appear to be before them in that respect. Whether this is owing to the low reputation in which the practice is held in these countries; we are not certain; but this is a very probable cause, as men of abilities and information, will not readily choose a business, which is neither honourable nor profitable: and much of the practice of surgery being in the hands of barbers, all over the continent of Europe: Germany does not appear to be before them in these respects; and no doubt for the same reasons; for although in all these, a few professors, and physicians to princes, are liberally provided for, yet that appears to be very far from the case with the greatest number of the practitioners.

We have been necessarily led into this digression, from the consideration that the temperature of the continent of Europe and America, are more similar, than that of the Islands of Britain and Ireland, is to it, as the excesses of heats and colds, are much greater on the continent than in the Islands, although the habits, food, and clothing, of the United States, are more similar to those of the Islands of Europe, than to the continent ; the language being the same, there are, therefore, a predilection in favour of British books, but there are sufficient reason, why the observations of the Ancients, are more applicable, to the present inhabitants of the United States than to those of Great Britain ; in the first place the similarity of the climate ; Hippocrates remarks, that in his time the inhabitants of Asia were effeminate, cowardly, and slaves to despotism ; whereas the inhabitants of Europe at that time, were brave, hardy, and independent republicans ; but a considerable change appears to have taken place since his times in Europe.

Medical Topography may be considered we believe, as the most conspicuous manner of investigating the effects and causes of the noxious Atmosphere, peculiar to some local situations, and seasons of the year ; from heat and infection.

These are subjects of investigation which although they have been commonly blended together, may very well be treated of separately, and in order to convey proper ideas of them, and of their separate effects, they should each be considered by themselves. It has been common for many years past, with practical writers, to begin their works with descriptions of the districts in which they have practised, such as the nature of the soil, minerals, vegetables, water and air ; similar methods have been followed by those who have attended armies and navies, with various degrees of attention, and abilities, so that at present there is scarce a work undertaken without some such preliminaries ; and as local situations and climates produce such varieties in the physical state of the human body, and its diseases, this mode of tracing their causes and effects is both useful and perspicuous. In this manner it has



been treated by Pringle, Cleghorn, Lind, Clerke and Blane, but particularly by Lancisi, who practised in Rome about an hundred years past, and several others, within the last fifty years; from these, as well as from some of the ancients, and more early moderns, we may collect much useful information in this mode of investigation; but although they have done much, we are not to suppose they have exhausted the subject: they have laid the foundation, but it will require the united labours of many others, before the future fabric is brought to that degree of perfection of which it is capable.

Of all those who have wrote on subjects of this nature, they have rarely separated the effects of miasmata, and of infectious effluvia, from those of heat and cold, so as to exhibit their effects separately, each by themselves, with their causes and means of prevention.

By pursuing these investigations, we trace the external source of diseases; but for the internal causes, we must have recourse to the state of the human body itself. Local situations, as towns, or the open country, whether elevated or low, marshy or dry, hilly or plain, covered with vegetables, or sandy and bare, all have their influences.

Medical Topography is a subject so obvious to all mankind, that there are no other methods of tracing the causes of diseases so universally understood; for almost every seaman can enumerate the diseases, and the times of the year in which they are most prevalent, in those places to which they resort; and it is also known to landsmen, that there are some particular local, flat, marshy situations, remarkably unhealthy; and also, that there are other mountainous, dry situations, which are remarkably healthy; and great varieties of intermediate situations, which partake of each occasionally.

As this mode of searching for the causes of diseases was begun by the father of medicine, we might expect that in the long interval from his time to this, 2200 years, it might have attained to a considerable degree of perfection in the present time, did we not recollect, that such modes of investigation do not well accord with the lives of scholastics, into whose hands much of the practice, teaching and



writing had fallen, until the latter ages, when true science has again been cultivated experimentally and rationally.

The air of cities and large towns, is generally known to be both unhealthy and disagreeable, especially when they are situated in warm climates, or in the warm seasons of the more temperate latitudes: therefore they are exposed to some diseases from which the country is exempt; but they are more free of others than the country—Heat and moisture are the great sources of diseases in the country. As fermentation will not take place unless the fluid exposed is in a state of rest, and in a sufficient degree of heat, as from  $60^{\circ}$  to  $100^{\circ}$ ; so likewise, the process will not take place in marshy ground, unless the moisture is in a state of stagnation. But pure water in a stagnant state will not undergo any change in consequence of heat and stagnation, unless it is impregnated with vegetable substances. Hence the water of clear ponds or lakes, with sandy or gravelly shores, do not undergo any fermentatory process, even in warm weather, and consequently do not vitiate the air; neither does the stagnant water of high northern latitudes, although strongly impregnated with vegetable matters; as for instance, the turf bogs in the northern parts of Britain and Ireland, although they are commonly full of stagnant water, deeply tinged with vegetable matters, yet there are rarely any instances of their neighbourhoods being more sickly, than the greatest distance from them; neither does the maceration of flax produce any sickness there, which Lancisi was under so much dread of in Italy: and as he was an accurate observer of facts, he must have had some reason for the dread he entertained of flax ponds; as the temperature of the countries are considerably different, especially in the summer and autumn.

It is to be hoped that the term of fermentation, is properly enough applied to the beginning of that sceptic process, which takes place in putrescent marshes, as this is a familiar term in domestic economy; it conveys a more clear idea of the change which takes place, than decomposition, by which the putrefactive process is understood best by chymists: we do not mean however to overstrain

this term, by applying it as formerly, to any of the animal processes, either of health or sickness; we only apply it to dead vegetables.

It is a fact established by innumerable observations, that the air of the open sea is always favourable to health, and also in large bays and lakes, whether they are fresh or salt water; although near unhealthy shores, they extend their influence to some distance, which Dr. Lind has limited to three leagues; but this can only be conditional. In many cases the noxious miasmata do not extend near so far as this; particularly where the exhaling surface is of small extent; but when it is large, the exhalations may reach much farther; in a state sufficiently strong to produce their pernicious effects; the exhalations of a surface of one mile, may be sufficiently blended with the atmosphere, so as to be quite innocent, at three miles distance, especially where woods or hills intervene; whereas an extent of twenty miles of marshy surface, will extend its influence, near as many miles out to sea, &c. and an extent of a quarter of a mile, may scarce extend its influence one mile in some directions; but the course of the most prevalent winds, influence these matters very much; for when the winds pass over those surfaces, from whence miasmata are extricated, we have always found that their influence is carried far in that direction, and a very short distance against the prevalent winds; but as in warm countries, there are both sea and land breezes, these pernicious effects are commonly carried in the direction of these winds; therefore they seldom extend their influence in a lateral direction. In the island of Sumatra, Old Bencoolen, in which there is a stagnant creek, has always been remarkably sickly to Europeans; it is only about one mile from Fort-Malborough; the space between them is interspersed with wood, and this last place has been always found much healthier than the former; and here all the company's servants have resided for many years past; but even this, and all these coasts are very unhealthy to strangers, especially in the rainy seasons. The basin in which ships commonly lie here, is tolerably healthy; it is three leagues from the shore, and is en-

circled with a congeries of coral reefs, which coral grows in the bottom of the water, like a shrubbery, of which a little island of about an acre in extent is also formed, about a quarter of a mile from the bason, on which grows some cocoa-nut trees. But Pulo bay, about ten miles to the southward of this, is one of the most beautiful, as well as the most unhealthy bays in the world : it is beside Sillesbar, where a considerable river empties into it ; the bay is about a mile in diameter, and circular, bordered with a beautiful sandy beach ; it is almost surrounded with low ground ; the point of land to the westward, which separates it from the sea, and also that to the southward is all marshy. The river causes the water of the bay to be brackish ; the bilge water here has a strong hepatic smell, (like liver of sulphur) ; all the inside of our vessel was stained by it with a leaden colour. We lost three men by staying eight days here ; and a corporal's guard, which was on shore at the company's pepper stores, were still more unfortunate, for they lost two or three of their number in the same time ; even the native black sailors from the continent of India, who were here in a country ship, were very sickly, as we were requested to visit them by Capt. Wilson, we believe the same who has since discovered and given us an account of the Pelew islands. The baneful effects of this place, are the more deeply impressed on my memory, because it was the first very unhealthy part in which we were in India, or elsewhere. Both fevers and fluxes were peculiarly malignant here ; and all along this coast, they both raged with equal violence, at the same time, and alternately in the same persons ; which circumstance is a proof of the near relation which these diseases bear to each other ; of this we have seen many instances since that time, in other southern countries, for there rarely ever happens a dysentery, without a fever, although fevers are not always accompanied with dysenteries ; but when they are, perhaps it might be accounted more properly a symptom of the fever than an original disease ; and we consider it as a favourable omen in fevers ; for we have always found diarrheas and dysenteries more tractable than fevers commonly are ; but on this coast, we

met with the most malignant cases of dysenteries, which we have ever seen in any part of the world; and also suffered personally from this disease, as an habitation to warm climates. The dysenteries which we have since often met with, in China, and other warm climates, were mild when compared with these.

Frequent rains appear to answer the same purposes in marshy grounds, as a constant supply of running water; either of them renew the water too frequently for fermentation to take place, whilst they continue every day, or every two or three days; for by this means, there are continual changes of the water, which partially answers the purpose of a stream running through it: on this account, so long as rains continue frequent, in summer or autumn, there are rarely any destructive diseases, although mild intermittents may appear: but when the rains cease to be frequent, then it is that the pernicious consequences follow; for the rain water of the former periods, being collected in ponds on the surface of the earth, and mixed with vegetable and other substances, undergoes a fermentatory process, by which the air is impregnated with the effluvia; which cause these deleterious effects which we so frequently experience in autumn; for that a great part of the substance of putrescent vegetable matters, are dissipated in the air, is proven by the almost total disappearance of such substances, and also of animal matters by putrefaction, and also by the effluvia which is extricated from them, and so sensibly perceived by the smell; and even by the process of vegetable fermentation, large quantities of fixed air is extricated.

The diseases most frequent at Canton, the only seaport in China, into which foreign trades are admitted, are remittent and intermittent fevers, and fluxes; but these diseases are not of a nature so dangerous here, as on the west coast of Sumatra; although the river in which the ships lie at Wampoa, is not half a mile over, and on the south side of it are Danes, and French islands, which are partly hilly and dry, and partly rice fields; and on the north side of the river, it is all rice fields for several miles, but there are large hills or mountains in sight over them;



and although this is within the tropics, and the heat much greater in the summer than it ever is at Bencoolen, being commonly from  $90^{\circ}$  to  $100^{\circ}$  in the shade in Canton, the winters are as cold as any person would wish after these heats, although seldom below the freezing point; but in Sumatra from  $70^{\circ}$  to  $90^{\circ}$  is the general range of the thermometer, from many years observation, at Fort-Marlborough, lat.  $3^{\circ} 36'$  south: but there are very large mountains 20 or 30 miles distance from the shore here; a chain of them extends all along the island, nearly parallel to the coast, and the country is almost covered with wood, only some small spaces, near habitations, where they have cleared for gardens, and the pepper plantations; but to an observer sailing along the coast, it has the appearance of a continued forest: this does no doubt contribute to moderate the heat of the air in the dry months; but from November to February, it is excessive sickly. The island of Java has much the same appearance as this, only that in some parts of it, there is more cultivation: the other Sunda islands and Malacca, are not considerably different from these.

The space proposed to be allotted to this part of the work in hand, will not allow of any thing like a general topographical description, even of those parts of the world which we have visited; this besides, would be an undertaking which would often lead us too far from the object of our pursuits: we can only give sketches, which may be applicable to other places in general, interspersed with occasional remarks on those places, which have come under our observation; so as by this means to keep the principal objects of pursuit in view. Instead, therefore, of a full account of one country, we must pursue our subject often through several: for of what utility would it be, to shew that the east side of one river, marsh or mountain was unhealthy, and that the west, the north, or the south, of others were so? unless we at the same time endeavour to investigate the causes of these phenomena; if we can do this with any degree of success, the principles on which we proceed will be universally applicable to others in similar situations.



Sir John Pringle found the health of the army in the Netherlands, to be in proportion to the depth of the water under the surface of the earth, which he measured by the depth at which it stood in the wells : but there are many very unhealthy situations, in which there is no stagnant water to be found ; we shall mention as one instance of this, Petersburg in Virginia. This has always been noted for an unhealthy situation ; yet here we could not discover any sufficient cause for this, either in the town or its neighbourhood, if we except only a small piece of banked meadow, of less than two acres, about half a mile from the town, on the river towards Blandford : Along the river side, between it and the town, there is a plain of two or three hundred yards over, which was said to be formerly marshy ; but which, when we visited it in the year 1798, was covered two or three feet deep with sand, by an inundation of the river, some years before—a very happy circumstance for this town, as it appeared afterwards : for this accident was said to have rendered the place much healthier than formerly. The opposite side of the river to the northward, is all high land, and the south side, on which the town stands, rises in different stages, and there is a gradual ascent for about three miles to the south west ; so that the town, although partly elevated from the river, is rather in a valley, with respect to the country, the river, or rather the creek of Apomatax, is scarce an hundred yards over ; in some places not as many feet, and at the upper part of the town, it is contracted between two racks scarce ten yards apart ; the whole country, in every direction, is elevated, and dry, unless some very small spaces down the river, along its banks, towards its junction with James's river. But the whole country is high, hilly, and broken, much more so than we could form any idea of, from any description extant.

Richmond also stands on high, broken ground ; on the north side of the falls of James's river it is accounted healthy for the country in which it is ; the lower part of this country, about Norfolk, is an uniform plain intersected with rivers and Creeks of tide water, it is generally co-

vered with pine woods, with some plantations interspersed, the whole country is universally unhealthy; unless on the shores of the sea, the Bay and large rivers, it is considerably better than farther inland, but even the rivers are far from being healthy, the open shores of the sea, and bay are more so. Hereabout all animal nature, appears to decline, had the Abbe Raynal taken his information relative to America; from this part of the country, he would not have been in much of an error, here the rabbits are not larger than rats, and black cattle do not attain one half the size which is common in other places; and the inhabitants shew the visible effects of a pernicious atmosphere, especially after twenty-five years of age; a thin, fallow appearance, is more common hereabout, than we have ever observed it, in any other part of the world, even in the hottest climates; and they are commonly tormented with agues, one half the year; and scarce ever get clear of the appearance of them; in this respect the town is more exempt from sickness than the country, but here they have the infection, of the pestilential, or yellow fever, every two or three years which although it spares the natives; and most of those who have resided there, two or three years, it is very mortal to all strangers from northern, or healthier situations, even those from Petersburg, or Richmond, Williamsburgh, or York, commonly suffer here in the autumn, the soil hereabout is uniformly a sterile, loamy clay, with a small mixture of fine sand, and no gravel, or stones of an ounce weight, within many miles; by this means whatever rain-water falls on the ground, lies until it is evaporated, for there are no declivities, unless on the banks of creeks, to convey it off; and the earth, is of a nature too compact to absorb it; by this means, it soon becomes impregnated with vegetable matters, and by the intense heat of the sun, exhalations of a most pernicious nature are extricated; by which the whole atmosphere is adulterated, particularly when the wind is from the south, to the south west, for in this direction, it passes over a large extent of such low ground, as this described, but particularly the great dismal swamp which

is in some parts only five or six miles distant : and the air which comes in that direction, in warm, sultry weather, such as it very generally brings with it, is by far the most disagreeably suffocating, and pernicious, that we have ever experienced, in any part of the world, even in Sumatra or Java. It appears to many an inexplicable mystery, why the stationary inhabitants of this town, are so generally exempt from the infection of the pestilential fever of the fall season ; when at the same time, it rages so violently among strangers, but any one who makes a comparison of these people, and their local situation, with those of other place, further north, we are persuaded will find no difficulty in the matter. It is certainly to be explained on the same principles, by which it has been found, that the healthy, and robust, inhabitants of northern counties, are more subject to this disease, and generally worse under it, than the inhabitants of warm, and unhealthy countries are : in Charleston it has always been remarked, that those who have lately arrived there, from the northern states, suffer most by this disease, when it has raged there ; and in the West Indies, it is the armies, and fleets, and other lately arrived strangers, who suffer most by it ; and in this, there is certainly nothing abstruse ; but the great source of error arose from confounding the pestilential fever, with the common remittents, between which, there are very great and obvious differences, both in their nature and appropriate treatment.

The effects produced through the medium of the air, are very little regulated by latitude alone, other local circumstances produce much greater effects ; such as the elevation, and form of the surface, and the nature of the soil ; the fenny parts of England, in Cambridgeshire, Lincolnshire, and Kent, and the low, marshy maritime parts of the Netherlands (or Belgium) are visited with fevers every autumn, although the billy ground is very healthy, only a few miles distant. Where hills and woods intervene, they are very great preservatives, although an eminence, exposed to the marshy exhalations, is not safe, as we have repeatedly experienced. In the autumn, the

winds are frequently from the southward; in all the low, unhealthy, maritime tract of country, which extends from the Neverfink hills in Jersey, near Sandy-Hook, to Cape Florida: this track extends across Jersey towards Burlington, and down the Delaware to Christeen Creek, which separates the high and healthy, from the low and unhealthy parts of Delaware, and it crosses this neck, which separates the two bays; so that all the peninsula between them, is in general unhealthy; this low track crosses the Chesapeake southward of Anapolis in Maryland, and continues to the south-westward through Virginia, in the southern parts of which it extends near 100 miles inland, and continues nearly parallel to the mountains, and to the sea coast, through the Carolinas, Georgia and Florida; but besides this great track, which is subject to be visited by fevers, and fluxes every autumn, there are many other smaller districts, in other parts of the United States, of a similar nature, principally where there is flat or marshy ground, and about small lakes, or slow running rivers.

In the western parts of the state of New-York, principally about the small lakes, there are large spaces of flat ground, and much stagnant water, and here agues and remittents prevail, commonly succeeded by obstructions in the viscera of the belly (abdomen) as the liver and spleen, and the inhabitants are commonly of a fallow colour. The British settlement on the west side of Niagara, is remarkably unhealthy; agues are said to be more prevalent there, than in any other part of North-America; and in common, where this is the case, musquitoes and other insects are numerous, and they abound through all these parts. We would not have suspected, (*a priori*) to find such a country as this, so far to the northward, particularly about Niagara, where there is much high land, and a waterfall so stupendous! But near the settlement there is much marshy ground, and slow running streams, on the west side of the great rapids. Mr. A. Ellicot, who is perhaps better acquainted with the geography of this country, on the New-York side, than any other, informs us, that the neighbourhood of the small



lakes is generally unhealthy, because of the stagnant water, which hereabout has not a free discharge—a very common occurrence about such lakes ; but that the shores of the great lakes, are salubrious ; in this respect they resemble the shores of the sea ; for their extents are such, that we cannot expect any noxious miasmata could be carried over them. In the North Western Territory also, between the Ohio river, and the great lakes, it is an almost continued marsh, particularly beyond the great Miami river, and towards the heads of the rivers which empty into the lakes, the Ohio, and Mississippi ; only between Lake Huron, and Lake Michigan, there is an elevated plain, of dry and healthy ground.

But now as we have pointed out some of the worst, we may also delineate some of the most healthy situations, in the United States. In the middle and southern states, the country is in general healthy from the falls of the rivers to the mountains, and thence to the Ohio and Mississippi, with some few exceptions, below the falls of the Ohio. In Kentucky, and about the Yazaro river, there are large tracks of unhealthy country, and in some other of the lower parts of the western country towards Florida, principally near the rivers. And in Pennsylvania, Harrisburgh has always been noted for remittents and fluxes in the autumn, principally on account of some mill ponds ; but this is partly remedied ; but all the other interior parts of this state, are scarcely exceeded in healthiness, in any part of the world, and but rarely equalled, as is very evident from the appearance, and healthiness of the inhabitants ; and instances of longevity are as common here, as they are to be found any where ; here the air is pure, seldom moist, cloudy or rainy : and Philadelphia, although so frequently visited of late years, by pestilential infections in the autumn, we can without hesitation assert, is generally as healthy as any other city of its magnitude ; the infection we have no doubt at present, has been conveyed to it, as we hope to prove ; and here it found a proper place for its propagation, in the close parts of the town, principally from Fourth-street to the river, where the town is closely built. New-York and Baltimore are not inferior, it is



probable, from all the information we can collect, to Philadelphia, in respect either of salubrity in their air, or agreeableness of their situations; but York is more incommodious in the narrowness of its streets, which as it is increasing so rapidly, on account of its eligible situation for trade, may prove an inconvenience if not remedied; Charleston in S. Carolina, is as healthy as a place so close can be, in a country so generally unhealthy, its being exposed to the sea air, is a peculiar advantage to it. In the summer the country is more healthy than the town; but in the autumn, the town is most healthy: this comparison of healthiness, &c. between the town and country; will apply in general to all towns and countries, unless when infections prevail. All large towns and cities, are hot and suffocating, in the warmest part of the summers; but as the cool weather begins to be perceived, in the evenings and mornings, and marshy exhalations are going on in the autumn; the towns are always more unhealthy than the country. This rule prevails to very high latitudes on continents, especially when the heats and consequent exhalations, are greater than in islands.

We have always found September to be the most sickly month in the year, and the next to it October, these are the most unhealthy months in all northern latitudes, &c. It is remarkable that the pestilential autumnal, commonly denominated the yellow-fever, has never yet been communicated from one person to another, unless on board of ships, or in the close parts of towns, or in hospitals, or prisons; this demonstrates plainly to us, that it is not infectious, unless the air is strongly impregnated with the effluvia, and this can scarce ever take place in the open country, neither is the typhous infection, readily propagated here, even in the towns.

We may notice in Sir John Pringle's observations, that he was always under apprehensions of danger, from any cause which prevented ventilation; his great dread of the typhous infection, in the hospitals and prisons, appears to have been the cause of this: hence his aversion to the neighbourhood of woods and plantations; which we would suppose he carried to unreasonable lengths. He

might probably have seen remittents common between woods and marshes, and laid the fault on the wrong cause. But wood has been observed, both before, and since his time, to be a very good defence against miasmata. Lancisci, who wrote fifty years before him, recommends wood in the strongest terms, as one of the most effectual defences against the air of marshes, and Pringle must have read this work, for he sometimes quotes it.

Lancisci quotes many former writers, in recommendation of the salutary effects of woods, when situated between marshes, and towns, villas, or camps, &c. and also concerning the pernicious effects of destroying them; and we may add that the same observations, are often confirmed in the present times, in the United States; for the new settlements, where there is stagnant water in their neighbourhoods, generally become more sickly, when the woods are cut down; for the moist surface of the newly cleared ground, is thereby exposed to the rays of the sun, with putrefying leaves of trees, &c. Elevated situations on the banks of rivers, are recommended by Pringle, for the same reasons, why he reprobates wood: ventilation was his aim in both; but although this may be a safe-guard against infectious fevers, it will, we are fully convinced, be no defence against autumnal diseases; but the very reverse, as we have experienced in several situations, many remarkable instances, of which we remember, in the United States, particularly Petersburg. Nor is Harrisburg, on a low situation, yet it is the most unhealthy town in Pennsylvania; and in all the southern states, the banks of the rivers are generally more unhealthy, than back from them in the pine woods; but there are many exceptions to this rule, we allow, where the banks of the rivers are dry, and no marshes near, they are generally healthy; and the salt marshes are never noxious, especially those over which the tide flows regularly; for fermentation has not time to commence in them between the tides. But the sea air is a great preservative, as far as it prevails, which may be about ten or twelve miles from the shore. We have often seen low situations, when dry, preferable to elevations, when in the vicinity of marshes, and equal-

ly exposed. We have from these circumstances, been led to believe, that the noxious principle was rather of a volatile, than of a heavy nature, and more probably inflammable, than fixed air; it may for ought we know, be neither, or nothing but an effluvia, which hitherto escapes analysis; but although it would be curious to discover, and separate the noxious principle by itself; it is yet a question, whether we should be thereby rendered more capable of preventing its pernicious effects? But even to be certain whether it is heavier or lighter than the atmosphere, would be a discovery of some import: but we shall leave it to future experience to determine, as we dare not be positive. Fixed air is known to be the most pernicious to animal life, and it attracts pure air very strongly, and they are difficultly separated; but although they are both much heavier than common air: we do not often find low situations, worse than those which are elevated, when both are equally near the sources of the miasmata.

When stagnant water, impregnated with vegetable substances, undergoes a fermentation; in the different processes, both fixed and inflammable airs, are extricated. But whilst there are any considerable quantity of water on the surface, it absorbs the fixed air, until it is saturated with it; on this account, whilst the surface of the earth is entirely covered with water, it never is pernicious, until it is dried up; so that the bare moist surface is exposed. Fermentation is most rapid in a heat from  $60^{\circ}$  to  $100^{\circ}$ . and by the putrefactive processes, vegetables are totally dissipated into air, all but their earthy parts: but either a very large quantity of water, or a frequent change of it, prevents these processes from going on, and in either of these ways, the pernicious effects of vegetable decomposition, may be prevented; for either much water, or a perfect dryness, prevents putrefaction.

It does not appear to be, by absorbing the pure principle from the air, that fermentation produces its bad effects; otherwise, breweries, &c. must have been more hurtful; but this we never have known them accused of. When fixed air is extricated, and confined in vessels, it lies on the surface of the fermenting liquor, but may soon

be dissipated and mixed with the surrounding atmosphere, by agitation and such means.

The Grecians appear not to have been totally unacquainted with the manner, in which the effluvia or miasmata of marshes is generated, and also the means by which it may be prevented, for it is related in history, that one of their generals with his army, being encamped near a low marshy tract of ground, in the autumn, the army became very sickly: but it was not convenient to remove the camp, it occupying an advantageous situation: through the marsh there had run a small stream of water; which was dried up by the heat, and draught of the weather: but it being found on a survey of the country, that a considerable river, which was in the neighbourhood, might be turned through the marsh, which being effected without delay, the whole surface of the marshy low ground was covered with running water, and the noxious exhalations prevented; whereby the camp again became healthy, without the inconvenience of moving. This is a fact, in proof of the knowledge which the Greeks had of the causes, and also of the consequences of marsh miasmata; for otherwise both the cause of the sickness, and the means of preventing it in this manner, would not have been so readily discovered; for Generals have been but men in all ages. But the Greeks were an acute, observing people, and there is no doubt, but they had collected this, as they did many other pieces of useful information, from observations. Finding similar causes produce similar effects, they would not fail to collect useful lessons from every source; many instances of which are on record.

Warm climates are not necessarily unhealthy, although they frequently are so accidentally: for we find many very healthy situations, in warm countries, although emigrants, or other strangers, must undergo a change in their constitutions, when they remove thither from cold climates; the human constitution has the power of accommodating itself to all climates, so as to bear them with but little inconvenience. But the change from cold to warm climates, is always attended with some dan-



ger, but most so after the age of maturity, in the young and strong, who are the most numerous class of those who are exposed to it. The natives of warm countries, and others who have resided for some years in them, very commonly enjoy good health. Although the inhabitants appear to be of more delicate habits of body; when we compare people in the same situations of life; as the mechanics, citizens, and labourers, of one country with those of the same occupations in others. But although warm climates are destructive to many northern constitutions, they appear to afford the greatest proportion of happiness to man, in an uncultivated state, of any other parts of the world; for there their wants can be supplied with very little labour; for the small quantity of clothing they want, may be supplied with very little industry, and the spontaneous productions of the earth, serves for the greatest part of their food; but in any other part of the world this is not the case; their habitations are easily constructed with trees; and on account of the simplicity of their living, and their free ventilation, with exercise seldom carried to excess, and no sedentary employments. The inhabitants of tropical countries are, in many respects, the happiest of mankind, and certainly, far exceed the inhabitants of the polar regions.

From ample experience, we have sufficient reason to be convinced, that an unhealthy atmosphere always produces a dark, or fallow colour, and also a languor, and weakness, both in mind and body; the bile has been thought to be a cause of the colour, although it is not altogether like a jaundice. But the scarfskin is commonly affected by the direct rays of the sun, which soon causes a visible alteration in the colour of very white persons; the secretion of bile is also greater, in those who have lately arrived in warm climates, than in others; the reasons of which we shall explain, when treating of bilious affections; the skin contracts a bilious tinge, different from the sun burnt colour. The brown colour appears to be owing, principally, to the substances with which the air is impregnated; for we find the inhabitants of all healthy warm countries, retain their white colour very well; par-



ticularly in small dry, and healthy islands, or high situations on continents. There are some of the Chinese remarkably white; they who are natives of high, healthy situations, in the northern parts of the country, but their colour is very different from that of Europeans, or their descendants in various parts of the world, it is a dead, or perfect white, without any mixture of the ruddy appearance of Europeans, whom they say are red men: but it has been found that either fixed, or inflammable air will change the colour, both of blood and muscular flesh from a red, to a brown, or dusky colour, and it never appears to impart that flow of vital spirits, which a frosty air does.

Whether this colouring matter, with which the body is impregnated in unhealthy situations, may be a cause of the endemic diseases which prevails there, we are not yet certain: it however, affords a visible indication of unhealthy situations.

The city of Washington, the present residence of the Federal Government, we must not pass unnoticed, as it may excite the curiosity of others, as it did our own. Although this place has the name of a city, yet from all appearance, the diseases of an open country are what we are to expect there, probably for many ages to come. All along from Tyber-creek, in the direction of the canal, which is laid down in the maps of the city, it has every appearance of being unhealthy, but principally, under the hill on which the capitol stands; both to the east and west. From the President's house, to near the eastern branch; the houses on the south brow of the capitol hill, we have every reason to suspect will be unhealthy in the autumn; to the northward also, from the President's house, there is a large extent of flat ground, under the hills, which form the northern boundary of the city, the soil here is a bluish loamy clay, on which the water lies after rain, until it is evaporated; the clay being so adhesive, as not to absorb it, and as they are cutting down the wood here and every other part within the limits of the city, it must in future be more unhealthy than hitherto; the eastern branch would appear to be a healthy situation, on both sides of it;

besides it is an excellent harbour. A moderate plan of about a square mile here, might possibly have been filled up, but the city never can : from the presidency to George Town, is a healthy like place, this town is placed on a congeries of small hills, and deep valleys, and is a healthy situation, and so is all the country to the north and west from this place.

The escape of inflammable air from putrefying vegetable substances may be proven by stirring up the mud at the bottom of some ponds in warm weather, by this means the inflammable air escapes in such large quantities, as to take fire on the application of a candle, and to burn all over the surface of the water, or the bubbles of air which arises when such mud is stirred up may be collected in a glass vessel, by filling it with water and inverting it over the ascending air, which will displace the water ; but as inflammable is lighter than common air, to retain it, the mouth of the vessel must be held downward, until a candle is applied to it, and it will burn. In several parts of the world there are springs containing inflammable air, there is one in the interior parts of Virginia, and another near Wigan in Lancashire in England, but probably the quantities of it may be so small as not to be hurtful, as we have never heard of any pernicious effects from it. But the fixed air which is extricated in marshes, escapes in the greatest quantities, as we would be led to suppose, after the water is nearly dried up, and the bare mud is exposed to the heat of the weather, or where there have been no depth of water : and it is in this state that the vicinity of marshes is always most pernicious, for then being most putrescent, they give out all their noxious principles to the air. Mr. Orme relates in the account of his journey over land from India, that the Arabs take a cruel manner of revenge on the Turks at Bassorah, for by breaking down the banks of the Euphrates, all the country is overflowed, but as it is by damming up the river they do this, (the Arabs occupying the mouth of it) as the river rises it forces its way, by breaking through the dams, and leaves the wet ground exposed to the heat of the sun.

A pestilential fever begins to shew itself, as the lands grow dry, by the evaporation of the water: and it commonly rages with such violence, as to carry off many thousands of the inhabitants of that city. The country of Bengal, whilst the low ground is covered by the annual floods of the Ganges, and by the periodical rains, or high spring tides, continues tolerably healthy; but as soon as the water retires, and the earth begins to dry, the muddy substance left upon its surface, consisting of decayed vegetables, and other putrescent bodies, begins to corrupt by the violent heat of the sun, and raises up into the air a vapour, impregnated with various exhalations; and then the sickly times commence, caused by the exhalations from the earth in this state.

The overflowing of the Nile, puts a stop to the plague in Egypt, by its covering the low ground, and preventing the evaporation of putrid matters. Agues and remittent fevers, are much more common in the Fens of Cambridgeshire, and Lincolnshire, in very dry seasons, than in wet years; because in wet years they are covered, but in the driest they are moist. The states of Holland were so sensible of this, by experience, that in 1748, they laid the country about Breda, under water; and ordered it to be kept so until the winter, in order to put a stop to a sickness which had arisen, from the exhalations of half drained grounds. The nature of the soil, must likewise have a great influence on the health of its inhabitants; a moist soil always disposing vegetable matters to putrefaction. The soil of some parts of Dutch Brabant, is a barren sand, but water is every where to be found within two or three feet of the surface of the earth; and in proportion to the depth of the water, the inhabitants are healthy or sickly.

It was many years ago remarked in an hospital in Jamaica, which was built near stagnant water, that common intermittents being brought into it, soon degenerated into malignant fevers, very dangerous, and difficult of cure; so that they were obliged to build another hospital, in a more healthy situation; and there the patients have a much better chance for a cure.

Remittent fevers, and dysenteries, seem to be nearly related to each other, and have the affections of the biliary secretion, for their common attendants; but they rage violently in some places, while in others, very little distant, they are never known; and it is sufficiently proven, that this difference depends solely upon their different local situations, &c. with respect to swamps, and the course of the winds.

The letting out the water from the fosses of fortified towns, has produced malignant remittents, which letting it in again, has put a stop to. The cutting down of vegetables, such as wood, bushes, reeds, hay, or rice, produces the same effects, as letting off the water, upon a double account; first because their shade defends the moist surface in part, from the rays of the sun. Secondly, because vegetables contribute to purify the atmosphere, by absorbing the noxious airs, and when the sun shines upon them, perspiring out pure air. Attending to these principles, may be often of use: for although crops of hay, rice, &c. must be cut; yet the places where both of them grow, very often admit of being overflowed, especially in the autumn: and if this was done, so soon as the crop can be carried away, and suffered to remain so until the winter; it would be a certain means of rendering their neighbourhood more healthy; and reeds, and wood should be suffered to grow, and where there are none naturally, they should, if possible be raised by culture, especially about places which cannot be kept covered with water, and are marshy, or wet.

It is not a little curious to observe the external appearance produced by the effluvia of marshes, swamps, &c. upon the human body, even a few months residence near them, produce a visible alteration; and it is the more observable, the longer any persons are in such situations: the colour grows fallow; they become less cheerful, and have not that flow of animal spirits, which is common to the inhabitants of more healthy situations: and they grow more languid, and indolent: those born in such unfavourable situations, have all these characteristic marks, which are proper to their native soil, in a still greater degree; for



it must be allowed that the physical, as well as the political state, must affect the inhabitants.

It may be taken as a general rule, that where the inhabitants of any district, have a good florid colour, the local situation of their residence is healthy: and where they have changed the red, and white, for a fallow complexion, it is unhealthy. We do not know of any other place, where this is more visible, than in the southern states, for it is very easy to know the rice planters, and others who live near the rice swamps, when in Charleston, by their colour alone, from those who live in more healthy situations. On the coast, it is generally a dry sandy soil, and that, together with the sea air, preserves their colour; many of those born, and educated in Charleston, have a very fine complexion. But it is on a dry, sandy situation, open to the sea breeze, and nearly surrounded by water. The indigo planters live on the islands, and near the coasts, and do not require swamps for their crops to grow on; they are generally healthy: but the people from the back country are both better coloured, and healthier than they are.

Doctor Crawford proved by experiment, that the black colour of the blood, was caused by inflammable air, in a concrete state, which is generated in the animal body, and that it predominates more in a cold, than in a hot atmosphere; this he proved by introducing inflammable air into the arteries of animals; which changed the red arterial blood, to the dark colour of the venal blood; and he thinks the reason why animals are no hotter internally, in a warm, than in a cold atmosphere, is because their blood does not, in the latter, collect so much of this inflammable air, in the course of the circulation; and consequently does not attract so much pure air from the atmosphere; nor indeed does it require so much to preserve its properties. By Dr. Priestley's experiments it appears that pure air will penetrate through membranes, and communicate the scarlet colour, to the dark venous blood. But when the blood does not meet with pure air in the lungs, it is not so capable of stimulating the heart to motion, so that it grows more languid, in proportion as the



animal is deprived of pure air ; and if altogether deprived of this stimulus, its motion ceases, and death ensues ; as in suffocation, by hanging, or drowning. This change of the colour of the blood, may be seen on that drawn from a vein, the surface acquires a scarlet colour, by attracting the pure air from the atmosphere, and giving out its inflammable air to it ; but the under part of it retains the black colour by not being exposed equally to the air. Dr. Crawford thought the cause of the great heat in ardent fevers, and in cases of inflammation, was owing to a greater quantity of inflammable air being formed, by a putrescent disposition in the parts ; and consequently their attracting more pure air, and setting free more heat at the same time.

Large woods are of great utility in guarding against the bad effects of the vapour of stagnant water and the like. This appears to have been well known to Lancisci, at Rome ; for in his works (*de nox. pallud. effluv.*) there are several letters in proof of the salutary effects of wood, and containing many reasons, against destroying some woods, in the territory of the Pope, which had been proposed to be cut down ; he quotes a number of authorities against it, and relates many cases where similar proceedings, had caused great sickness in towns, where for want of these precautions, woods in their neighbourhood had been cut down. Even a few trees he thinks, may in some places preserve a house, and a large collection of wood will preserve a village, or town in the country, from noxious effluvia, when standing between them, by intercepting the noxious air : cutting down some trees and leaving others, is not so dangerous ; this was a method recommended by him. The woods he speaks of, stood between some large towns, and marshes which were in their vicinity, and had been carefully preserved, for many ages, with a religious veneration : woods he thinks, are greater preservatives in such situations than hills, as the winds easier slide over hills, than over woods, and is not so much mixed and agitated thereby : even cutting down an avenue through woods, towards country houses, where there may be marshes near the other ends of them, has

often rendered houses unhealthy, by opening a passage for the marsh effluvia. The same author takes notice of several towns in Italy, being violently affected with very malignant fevers, from the overflowing of rivers, in the latter part of the summer; when the water they had left began to be dried up, from ouzy mud which they left behind; and some large ponds which were caused by the inundations, were with propriety advised to be let remain, until the winter, before they were drained, because it had been known, that whilst such places were covered with water, they were very little hurtful, unless, as they dried up about their borders, leaving some ouzy surfaces; for it is always after the water is evaporated, that the neighbourhood of such places becomes unhealthy; for while they are fairly covered with a sheet of water, putrefaction cannot take place, to such a degree; and of course noxious exhalations cannot be produced, for they are confined by the water. Healthy, or unhealthy winds, depends entirely on the state of the country, they last pass over. A north wind may be healthy in one place and unhealthy in another, according to the respective nature of the local situations they have last passed over, and the same is true of winds from any other point of the compass; so that to know what winds are healthy, or the contrary, we must be well acquainted with the local situation of the place, and its neighbourhood; and then we may be able to form a judgment, of the nature of the different winds, by the consideration of these circumstances. By such means the medical topography of any district, or country, may be elucidated, and brought to a scientific form; and this would often be very useful, more particularly in unfrequented countries: and be the means of guarding against unhealthy winds; such investigations may be particularly useful in choosing the situation of a new habitation, or for fixing on situations for camps, or military stations, or forts; and also in guarding those already standing. By covering, or draining marshes, planting trees, &c. between houses, and marshes, pools, or the like.—Standing upon an elevation, was sometimes thought to be very useful, in an unhealthy neighbourhood, and in so

far as it conduces to free ventilation and dryness, it may be of some advantage; but as inflammable, and (azotic) airs, are lighter than the common atmosphere, they rise upwards, so that the top of a hill near a marsh, is often a very improper situation; sometimes worse than beside the marsh below; these observations are not confined to any particular district: they have been made in different quarters of the world, and will be found equally applicable to various situations again.

The draining of marshes, or ponds, should always be accomplished in the winter; for in that season there is little or no danger from any exhalations, after they begin to dry, as would certainly be the case in summer, or autumn. When the Tiber had overflowed its banks, Lancisci's advice was, to let the water stand on the ground until the winter, before they should let it off: which was effected by drains made for that purpose; for experience had taught him the danger of drying up such places, in the latter part of summer, or autumn: although the way in which he went about to account for the bad effects of these exhalations, are antiquated at present, for not being acquainted with the alterations which are produced in the atmosphere by marsh effluvia, &c. nor the operation, or various uses of the air in the animal œconomy; he had recourse to the animalculæ discoveries of Lewenhoeck, the mania of the times, and accounted for all the appearances produced by marsh miasmata, upon the human body, by its promoting the generation of animalculæ in the body. Hence mercury being a destroyer of worms, and the diseases supposed to proceed from such small animals; calomel was used to destroy them, and to cure the diseases of which they were supposed to be the cause; here a mistaken theory directed the practice, and it was sometimes successful as a purgative, &c.

Small ponds of water and mud, which do not conveniently admit of being drained, may be rendered both innocent and pleasant; by separating the mud from their bottoms, and by that means making them deeper, and forming banks with it, about their borders, raising the edges of the banks, at an angle of about forty-five degrees

from the horizon, or where it is more convenient, to fill up their shallow edges with earth from the neighbourhood, than either their own mud, it may answer as well. In case ponds have streams through them, and are well covered with water, at all seasons, so as not to have their muddy bottoms exposed, they are not dangerous; by this means disagreeable, noxious and ill-flavoured ponds, may be converted into very handsome ornaments to gardens, or other pieces of ground, and be changed into pleasant pools, of a round, oval, serpentine, or any other shape, which they may most conveniently admit of; and as brush-wood and trees, add greatly to the beauty of such pieces of water; willows, or other wood, which commonly grows well in such situations, may be planted about them, for by their shades they are very useful in defending their neighbourhood from the suns rays, whereby noisome marshes may be rendered innocent, and where they are large, and admit of it, from some places in them being raised higher than others, there islands may be formed, of any convenient shapes, and planted with trees or shrubbery; they may be rendered both ornamental and useful; such improvements as this, though they may appear too laborious hitherto for America, yet they are by no means uncommon in the older, and well cultivated countries, such as in China, or Europe.

But the principal intention in rendering ponds and marshes harmless, is to prevent the fermentatory processes, from going on, and consequently the extrication of the miasmata, or the gasses, as these are noxious to animal life, and are in greater or less proportions, and in a variety of combinations, they are extricated where the putrefactive processes are carrying on; therefore, the air in their neighbourhood, must be impregnated with these gasses; and by this means, rendered unhealthy to the neighbouring inhabitants; every means, therefore, by which they may be made less hurtful, must be well worth the attention of medical gentlemen, and others who delight in the investigation of causes, from their effects, and applying them to useful purposes, for the knowledge of the causes, may often point out a practical method of prevention



or remedy, either of which merit our attention. As a moderate quantity of moisture is most favourable to fermentation, and likewise, a moderate degree of heat, and where there are much vegetable matter, the fermentatory process, always precedes the putrefactive: but animal substances do not go through the fermentatory process, but run directly on to the putrefactive decomposition, and and give out much of the azotic and inflammable airs, but there are commonly insects, and reptiles of different species, harbour and live in ponds, and marshes, which die as the water dries up, and putrefy; therefore, there are commonly a mixture of both the animal, and vegetable putrefaction in such places.

By this view of the subject, we see, that in order that the noxious effluvia may be prevented from being extricated, the whole surface of ponds, and marshes should either be kept totally covered with water at all times, unless in cold frosty weather, or whilst there is a heat above fifty degrees; or if they cannot be kept covered with water, keeping them constantly dry would answer nearly as well; for the rain, when it falls, is rather beneficial, than hurtful, in case it can be conveyed off, before it is impregnated with the vegetable substances by stagnation; as it helps to dilute, and wash off those offensive substances, and renews whatever may be stagnant; on this account, frequent showers, are a great means of preventing malignant epidemics in the autumn; and though they may contribute to cause intermittent fevers, or diarrheas, or perhaps dysenteries, by the moisture of the air, which they cause, and the consequent relaxation, and obstructed perspiration; yet they certainly are the means of preventing more dangerous species of diseases; as malignant, and dangerous remittent fevers, and dysenteries, as we have found from our own experience, as well as from that of others. Vegetable fermentation, and its consequence fixed air, appears, when united with moisture, to cause agues, or intermittents, of the least complex variety, but it is probable, that besides impregnating the atmosphere with fixed air, they may deprive it of a part of its vital air; for which the fixed air has a great attraction.



But however it happens, a predominance of noxious air and a deficiency of pure air, is the consequence.

The putrefaction of animal substances, and its consequent effects, in impregnating the atmosphere with azotic, inflammable, or other gasses, and effluvia, uncombined, are often the causes of very malignant, and continued fevers, as has often happened to besieged towns, and armies. A stratagem of a barbarous nature was used, for a purpose to this effect, and related by Mr. Gibbon in his account of the Saracens, when they over run Africa; one fortified place was impregnable to their warlike machinery; and as they did not choose to starve it, to a compliance, by a siege, they therefore gathered all the inhabitants of the country round about, and murdered them, and left the dead bodies round the walls; by which means a violent fever, or plague, soon obliged the place to submit, after most of its defenders were dead, and the remainder debilitated by sickness and fatigue. A mixture of these two species of animal, and vegetable substances may probably produce remittent fevers, properly so called; and the stronger it is of the produce of the putrefactive decomposition, the more the fever may incline to the malignant, or continued species; and on the contrary, the less of the putrefactive animal effluvia, and the more of the vegetable product there is in the atmosphere, the nearer it may incline to the intermittent fever or ague; and in this manner it is probable all the intermediate varieties, and species of intermittent, and remittent fevers are produced, from the various combinations, and intermixtures, of these different causes acting together, upon different persons, of different ages, sexes, and constitutions. But we shall give our opinions of the natures of infections and contagions hereafter.

*The Physical Effects of a vitiated Atmosphere on the  
Human Body.*

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**P**UTREFACTION, of either vegetable or animal substances, imparts certain effluvia to the atmosphere, which in many cases is easily perceived by the smell. Although this is not universally the case, even with the most noxious effluvia; any person who doubts this may soon be convinced of its truth, and of the absurdity of supposing that any chymical, or pneumatic proof, can be adduced to the contrary, by observing, after the flowing of the tide over any place where putrefying mud, and other substance are mixed together, in warm weather; this may be seen every day, in the summer about our wharves; for there they will find gasses extricated in the greatest abundances, which long before the names of hydrogene, azote, &c. were known, had been collected and burned. But whether, an eudiometer can discover it or not, it is not the less certain.

The effects produced by breathing a vitiated atmosphere, are very sensibly perceived, by persons of much nervous sensibility; some are so very susceptible of the changes in the purity of the air, as to be soon affected with an uneasy sensation of the lungs, whenever they sit for some time in a room, with about half a dozen persons in company, with the doors and windows shut, as in cold weather; and especially when a large fire, and candles are lighted: but more readily in large companies. This is a disposition with which we are acquainted by experience; having lungs extremely susceptible of the variations in the purity of the atmosphere, either in close towns, or in marshy, or other such situations, where the air is vitiated, although never troubled with asthmatic, or any

other affections of the lungs. Close rooms first produce a lowness, or depression of animation, and an uneasy erythematic state, with obtuse head-aches; to relieve which, walking out, or through the room, are commonly sufficient; we have also often perceived a slight rigor, or chill, accompanied with a head-ache from walking about marshy situations; and yet it is highly probable that no chymical, nor other physical means could detect any impurities in this air, although we may often smell it. But we must remember that the properties of animal life, are not to be explained either chymically, or mechanically, although often attempted formerly.

We may observe, however, that in country situations, besides the free ventilation, persons in business are apt to have more active exercises, and commonly some difference in the other parts of regimen; and when they remove to towns, it is commonly in order to attend to some sedentary business, as study, writing, or other inactive employments; from which they commonly become low spirited, acquire an erythematic, or very susceptible habit of body; and it is not uncommon for them, even to become hypochondriac, especially if they have any cause to be uneasy in their minds at the same time. But symptoms of this nature take place in every person, in some degree, after changing from a country, to a city life: and it is very apt to appear in their countenances, which becomes pale, and effeminate, instead of the ruddy, rural appearance.

In London, and other such large cities, there can be no doubt that effluvia of various species, must contribute very much to cause fevers, in strangers; which are principally of a catarrhal nature in the winter; for as to typhous, or low nervous fevers, they are by no means so common in London, as in country towns, or villages.

Something similar to what takes place in close rooms, on a small scale, is, in some measure imitated in large, close built, and populous towns; but in them, although fresh air is not so effectually excluded, yet partly by the exclusion of the air, by the numbers, and vicinity of the houses; and also by various sources of septic

effluvia, unnecessary to enumerate here, besides the respiration of men; to which may be added the increased heat, in hot weather: which in large towns, so far exceeds that of the open country, as to make the change very plainly perceptible, even to the most careless, and torpid observers.

Those who have been brought up in the country, on removing to large towns, perceive this difference in the most evident manner, for the first year or two, especially in the summer; this appears to be in some measure similar to the effects produced by a change of climate; for the state of the body, in either case, has to undergo an alteration, so as to be accommodated to its situation; this change we have known in some instances to be attended with a fever, so violent as to prove fatal to some of our acquaintances in London. The author had this also remarked to him many years past, by Mr. John Lewis, surgeon, in Half Moon Street, Piccadilly, London.

An air impregnated with septic effluvia, or even with moisture, depresses the mind, and also predisposes the body to sickness: so that in low, and unhealthy countries, we rarely ever find the mental faculties raised above a mediocrity; because both the physical, and mental faculties, are impaired by a vitiated atmosphere; this effect is probably more plainly to be perceived in some unhealthy districts in the United States; particularly all along maritime parts of the middle and southern states: where we believe the effects of local situations are as visible, as in any part of the world, in the same space of time: and the lower parts of Virginia, are not exceeded in this respect by any part of the Carolinas, or Georgia.

The inhabitants of dry, hilly, and mountainous countries, are generally endowed with greater mental capacity, as well as activity, and strength of body; than those of flat low countries; for as the native character, is imprinted in early youth: so there is no doubt that the mind, as well as the body receives lasting impressions from the early surrounding objects.

Could we determine the distance to which the noxious exhalations of marshes may carry their deleterious effects,



and the most effectual preventative means, it might be of much utility ; but this appears to vary according to the extent of the surface, and the state in which it is ; for a small pond will be very deleterious in its own vicinity, if there are any houses near it, as within a few hundred yards ; and may not hurt much at half a miles distance, or much less, in case any hill, or rising ground intervene. But wood excels all other defences, except perhaps, inhabited houses : for one end of a small village is often healthy, whilst it is sickly in another ; but a small surface only affects scarce a mile in diameter about it, by its exhalations being soon blended with, and mitigated, by the surrounding atmosphere. A large surface of marsh may carry its pernicious effects many miles ; we have very evident reason for judging, that the great dismal swamp near Norfolk, in Virginia, affects the health of that town, and neighbourhood considerably, although the main body of it is at least twelve miles distant ; for whenever the wind comes in that direction, in the summer, it is of the most suffocating, and debilitating nature to be found in any part of the world ; although there are wood between them in abundance ; but besides that swamp, the winds which blow over it, also passes over a great extent of a flat, and unhealthy country. But in all the Southern States, the sea, or bay shores, are far preferable to inland situations ; the air from the water, is exhilarating, and its salutary effects are very evident on the inhabitants, as well as on invalids, who resort there on purpose.

The influence of local situations on the physical nature of mankind, is too obvious to escape any observer, who will use his own senses, and his reason, without bias, or prejudice ; so that we cannot but wonder that even speculators should deny it ; however in the event, sober sense, and reason, will ultimately prevail in this, as well as in many other frivolous contests, only by turning men's attention to them.

The body, and the mind, are both much depressed in a warm, and moist atmosphere ; for, the air taken into the lungs does not afford the *pabulum vitæ*, or oxygene. The



effects of a dry, clear, and pure air, on the contrary, even although much above the medium temperature in heat, are exhilarating, and conducive to health; and we may say the same of a cold, dry and pure air, as in frosty weather: every person in the temperate climates, knows from experience, how much more agreeable and healthy a frosty air is, than a cold moist air; for when there is much moisture blended with the atmosphere, it acts more speedily as a conductor of heat from the body, than when it is dry, as may be observed here in the times of N. East winds, in the spring every year, as they are the most remarkably moist and cold of any winds we experience. Cold and moist air produces catarrhal affections, such as coughs and colds; and when these are neglected, sometimes even consumptions, or catarrhal fevers, &c.

Clear, frosty weather, predisposes to inflammatory affections; but this is after its continuance for some time, particularly in the robust, &c. for any variation requires some time (commonly about two or three weeks) to produce its effects on the body. A clear, dry air, promotes cheerfulness and animation, although it is warm. It is remarkable that our winds from the west, and all round to the north, are generally dry and cold—in that they partake of the properties of the countries over which they pass; and the wind from the south to south-west, is commonly warm and sultry, or depressing.

As for an eudiometer or any other apparatus, discovering different effluviæ of vegetable, or animal origin, it is probable that we might as well expect to discover it by mechanical, as by any pneumatic instruments; for although we may discover the heat, weight and moisture of the air, yet we are very sensible of effluvia in the air, which no instrument, other than the olfactory nerves (of the nose) can discover; and of tastes, which no chymical experiments, we doubt ever will discover. The sight cannot detect smell, nor the ear colours, although animal senses, and very extensive ones; and it is apparent, that there are many noxious substances may float in the atmosphere, or be conveyed by contact, which we have no sense appropriated to detect, although that of smell certainly comes nearest

to it ; for we have often perceived infectious diseases by the smell, when well acquainted with them, particularly the typhous fever ; and in some measure, but not so easily, the pestilential or yellow fever ; but no other means than actual experience, ever will demonstrate the proper actions of any substances on animal life, whether in a healthy or morbid state, either elementary or medicinal. Some of the more obvious gasses, as fixed air, and the mineral poisons, may be detected a priori ; but even the animal poisons cannot be discovered by chymical analysis, neither can the vegetable.



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THE  
N A T U R E  
OF  
*I N F E C T I O N.*

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**D**R. BISSET, on the diseases of Great Britain, writes, that about the middle of July, the inflammatory disposition generally gives place to the bilious, which is more or less prevalent in the latter part of this month, and in August and September, in proportion as the weather is more or less dry and sultry; but if towards the latter end of July it is very warm, close, and moist, the bilious dispositions will be combined with the putrid, or petechial, and generally with a catarrhal and dysenteric disposition; indeed the petechial, and miliary fevers, which prevail from the influence of the weather, and are propagated almost wholly by infection, are usually generated by changeable weather, with a prevalent moist temperature of the air, and southerly winds, and are generally catarrhal, or attended with more or less of a cough, pain, or obstruction of the breast; provided the affection which is the chief cause of the fever, is not determined in a great measure to the bowels, so as to give rise to a diarrhea, or dysentery, as is not unfrequent, especially towards the autumnal equinox, when the morbid humour is determined inwards by the external cold, and a peculiar tendency to the intestines.

In some instances the affection is generally dispersed through the habit, and gives rise to wandering pains, so as to cause fevers more or less rheumatic : but if nervous and inflammatory fevers prevail, betwixt the vernal equinox and the summer solstice, the bilious and malignant fevers in the autumn, will be in a great measure rheumatic, and in many instances nervous, and erysipelatous, and the diseases arising from these predispositions, will often be exceeding obstinate and dangerous ; especially if the original cause is productive of infection, from the effluvia of patients under malignant diseases ; or if the antecedent dispositions of the body, augmented by the forementioned local, or accidental causes ; or by living low, on coarse, indigestible, or unwholesome food ; or breathing a close impure air, in a crowded, unhealthy town ; or by having the spirits sunk by fear or anxiety—under these circumstances, a most malignant epidemic fever may arise, without the aid of any imported infection, from other places : but such a fever when once begun, will admit of being propagated by the effluvia of the sick, so far only as to become epidemical, in such places only, whose inhabitants are in a great measure predisposed thereto by similar causes. When such malignant fevers are epidemic, and very fatal in populous towns, the atmosphere of those towns will become much vitiated, by the effluvia of the sick, and unburied dead, and other putrid and excrementitious exhalations, so as to produce infections, which so often prevail in close and populous towns, which stand on low ground, or within the influence of the vapour of marshes, and are much crowded and dirty, after a continuance of warm weather. All these states add to the malignancy of the disease, and cause an atmosphere so impure, as will affect strangers who remain but a short time within its influence ; but after their return home with the disease, provided they live in salutary villages, they will not propagate the disease in those places, unless the inhabitants are predisposed in a great measure to malignant fevers, by the state of the atmosphere, or from some other cause ; but they will more readily infect persons who live in the same houses with them, or sleep within the influence of the



effluvia of the sick, or are very often near them, and susceptible of the disease; but it will rarely affect those who only transiently visit the sick, and do not live within its influence, provided they are not naturally of a delicate frame of body, with an acute sense of smelling.

We hope that no medical man of information, will deny that infectious fevers may be generated, in any part of the world; where several people are crowded into a small space, and are at the same time low-spirited, and live in a low, dirty manner. Some members of the faculty hitherto deny that any fevers become infectious, in any case whatever; but as we are convinced of the effects of infection experimentally, we are not even at liberty to doubt of it; and those who do, we shall recommend to them a little more extensive experience, common sense and reason.

Although infectious fevers are not properly diseases of warm climates, yet they sometimes originate there, from confinement, and want of pure air, in crowded ships, hospitals, or prisons, or small and ill ventilated houses, in close dirty streets, or alleys of towns. But they are much more apt to break out after the greatest heats are over, in the more temperate climates, when there is a predisposition to remittents, or dysenteric complaints. And cold evenings, or mornings, which obstructs the perspiration in predisposed habits, are frequently occasional causes of these diseases. And at these times, as the windows, &c. of the chambers of the sick, are apt to be kept close shut during the night, so that the confined air, becomes strongly impregnated, with the morbid effluvia; which if the disease is violent, approaches near to a continued fever, in its type, it is the more apt to become infectious, as almost every species of fever does, from the same circumstances, some do not even except the ague; the influenza is only an infectious catarrh, or cold.— And the consumption we know, from repeated experience, of its infecting the attendants of the sick, is as certainly infectious in warm climates, as any diseases to which the human frame is liable; and the low nervous fevers of northern countries, under the names of typhous fever is remarkably infectious; especially in manufactu-

ring towns, and even in the open country ; but more especially among the poor, who are generally most predisposed to it, from their modes of living, lodging, and regimen ; as low spiritedness, and discontent, from want and oppression ; all of which contribute, both to generate, and to spread the infection.

As we must allow that so many species of fevers become infectious, it is not strictly proper, to consider them as a genus by themselves ; as they, like all other fevers, appear under such variety of forms ; only that they are more virulent when infectious, than otherwise. We only consider them here, in order the better to illustrate the fevers of warm climates, when they contract an infectious nature ; as there appears to be, in some instances, a combination of the malignant infectious fever, with those of the remittent, autumnal fevers of temperate climates, which partakes of the symptoms, infection, and malignancy of both together. It would break the links of the chain, did we leave out this one, by which they seem to be united ; for the more we know of fevers, either by practical observations, or from the works of the best practical authors, the more we are convinced, that there are all the intermediate, and almost imperceptible shades, and varieties to be found, from the slightest ague, to the pestilential, or yellow fever, in all its greatest violence ; and we have no doubt, but the plague itself, forms the highest grade.— We choose the term of pestilential, rather than yellow fever, for the sake of distinction, as the yellowness is only accidental ; because common remittents are often accompanied with it ; this, like many other appearances in fevers, is only accidental ; for fevers, like human faces, have some things in common, or a general similarity, but are every one different ; and by an accurate observer may be distinguished, as we see one epidemic, and endemic differing from others : and even the different individuals in any one species of fever, frequently differ from others, by innumerable circumstances, of age, sex, and temperaments. So that the most extensive practitioner, may not have two patients exactly in the same situation, in any one species of fever, but so that some distinctions may be per-

ceived, by an accurate observer; and so various are the appearances, in the same epidemics, that the oldest and most experienced practitioner, may not in the course of an extensive practice have ever seen two persons exactly in the same situation. Therefore, as the variety is so great, it would be endless to specify every little difference, with a particular discriminating character; and the only resource we have, is to divide them into genera, and to pay particular attention to their varieties, in the treatment.— Therefore, as the greatest number of fevers arise from marshy exhalations, and from human effluvia, as two great sources, the latter of which we mean to treat of in this place. There are other causes of fevers, as cold, wounds, contagions, or other noxious impressions, which we shall not notice in this place, as not coming within our plan; although they likewise, on some occasions become infectious from the common cause. Typhous fevers are most common in temperate, or cold countries; and although they may originate from various causes, at their beginnings, as bad provisions, famine, or despondence, yet from whatever cause they arise, they all put on the same general appearances, and become the more violent, the more concentrated the infection is. I once saw the rise and progress of one of these infectious fevers, in the winter of 1787-8, on board the *Sandwich*, flag ship, at Sheerness. Our business was to receive the press men, brought down from London, and from all the east coast of Britain; being the only medical persons on board, for near two months, although it was my first appointment in the navy; my attention was the greater. There were at first a great number of troublesome coughs, and bad colds; but early in the winter a typhous fever appeared very infectious and mortal. The situation of press men on board a ship of war, it is certain, have all the causes for producing infection, dirty, discontented, often without beds, ill clothed, and even in want of fresh air, with many other circumstances, sufficient to produce infection any where: this fever raged for three months, notwithstanding every precaution we could use, such as fumigations, washing with vinegar, &c. That was while we were in

a state of uncertainty, whether we should be kept in commission or not : the men were taken, two, three, or four, daily, until the day we received orders to get ready for being paid off; and the universal joy and animation which that news diffused through the ship's company, dispelled the infection at once; so that although we were three weeks from this, before we were paid off, there was not one taken that whole time : neither could this have been a mere pretence to get off, for we were well acquainted with the disease before this, so as not to be easily deceived in its symptoms, and appearances. And we are sorry we had still stronger proofs of its reality; for notwithstanding every care which could be taken of them, by a physician on shore, together with myself, and my assistants; yet several of them died!!!

Infection may be conveyed three ways; but the most common is that in which it is diffused in the air in a volatile manner, as the effluvia of patients under fevers, or fluxes. It may also be conveyed in clothes, or any such materials, of a porous nature, particularly wool, or cotton, in this manner it has been named fomites. But there are other species of infection which never are diffused in the atmosphere; but are of a more fixed nature, as that of the syphilis, itch, &c. These last are denominated contagions, because they require actual contact for their communication; but they all appear to observe some general laws with respect to their propagation, and their effects on the human body. The small pox is communicated in both ways; and with respect to them, a query arises at present, since the discovery that they are common among cows, and that they infect those who milk them by contact, how it happened that they never appeared in this manner in Europe, until the eleventh century?

We know that there are certain laws, belonging to the animal œconomy, with regard to the operation of particular substances upon it; as medicines or poisons, condiments, or foods; that by beginning with very small quantities, and increasing them gradually, the body becomes habituated to their use: therefore, they do not produce any very sudden alteration on it; for it is well known, that



there are many species of food, which in those not used to them, will produce very sensible effects, causing sickness, and various commotions in the system, which through use, will become both agreeable, and nourishing; likewise vinous and spiritous liquors, do not produce any great effects on those who are habituated to a moderate use of them: whereas even a small quantity taken by one who never used any before, will cause giddiness, and drunkenness; and it will require larger doses to produce the same effect on any person, who has been only used to small quantities before, as we may frequently witness. In this case, they appear to act much in the same manner as poisons, by disordering the animal œconomy, and preventing its functions, and very generally laying the foundations of a premature old age, chronic diseases, and death, long before they would otherwise have approached the same persons, had they observed the golden rule of moderation, in their gratifications!

Medicines are such substances, as by being given in moderate quantities, and frequently repeated, effect some change in the constitution: for this purpose, we suppose two or three weeks as long as any one medicine or composition can be successfully used, until it should be changed for some other of the same class; but recourse may again be had to the first, after a week or two, in case it is preferred; for this prevents it from becoming habitual. On this account, medicines never should be made over free with as preventatives of diseases; unless there is evidently a predisposition to disease prevalent in the system: for any change they can make upon one in full health, must be for the worse; besides, habituating the body to medicines or cordials, drams or bitters, when there is no necessity, is only a profligate abuse of them, so that we cannot expect much efficacy from the same articles, when there is real need of them; because the body is already habituated to their use, and even the most deleterious poisons may, through use, become so far habitual, that they will not cause either sickness, nor any material derangement, in those who are used to them: in the same quantities, which would cause both sickness and death, in those who are not



so accustomed to their use, as we sometimes experience in the use of opium, &c.

The operation of infections, or contagion, on the human body, whether applied through the medium of the atmosphere, or by contact, appears to be very similar in their effects to poisons, spirituous liquors, or medicines, although these last, when properly applied in a state of disease, or of predisposition, so generally produce salutary effects; for some infections are much less apt to affect those who are gradually, or frequently used to, and become callous to them, than others; who have not been so accustomed to their action. This is a reason why physicians, and nurses, and others who are frequently employed about those who are ill of infectious fevers, are less apt to be taken with the disease, than others, who are not so habituated or accustomed to the infectious effluvia; and it is on the same account, that people in prisons, work-houses, &c. where infection resides, are not so apt to be diseased by it, as others who have been used to a more pure atmosphere, when they happen to be exposed to the infectious effluvia; besides this, there appears to be a predisposition to receive the infection in some persons, more than in others; and most people are more susceptible at some particular times and situations, than in others. Those infections, of which the constitution is susceptible but once in a lifetime, as the small-pox, and measles, appear to wear out all the susceptibility, of the stimulus of their infection, at the first attack, and some never are susceptible of it at any time; for there is about the proportion of one in twenty who never take the small-pox, and none ever take them or the measles more than once: these infections the system appears to become insensible to, by one application, and that susceptibility never returns. There are diseases likewise, which if they do not kill by the violence of the irritation, and inflammation which they cause, will go through their course, and leave the patients in health; whereas, the contagion of syphilis will not leave the constitution, but go on for years, and if it is not properly treated, it will cause a miserable end at last; of this infection the constitution appears to be always susceptible. But in

varieties of infectious fevers, the susceptibility of the infection appears to be worn off by the disease; for they will all go off naturally, unless they kill by the great irritation and consequent inflammation, on the first onset of the disease, by becoming insensible to the native, and weaker stimuli of the circulating fluids, and of the air in respiration. When the vital energy is exhausted in the progress of the disease, it becomes extinct; but the susceptibility to these infections, appear to return again, after the person has been some time in health. In these diseases the continuance of the stimuli appears to render the constitution insensible, or callous to its operation, or otherwise they would never go off, or be cured; either by medicines, or by nature; if the morbid body could infect itself; but this stimulus, by becoming habitual, loses its power of operating, until the body has been for some time out of the use of it, and has had some time to recover strength and health; for although many relapse into fevers from very slight causes, before they have quite recovered their strength after an attack, yet this is always from some other cause, than infection—as from cold, improper food or drink, or from excesses greater than their strength can support. From these circumstances then, we are authorised to conclude, that although the human body becomes, through habit, insensible to the impression of infections, after being for some time exposed to them, and if I may be allowed the expression, callous to it, and lose the susceptibility of being acted on by use, which in some specific infections, as we have observed of the small-pox and measles, never returns; but in some other species of infections, it is very apt to return, after an interval of time. It may be remarked that people of an inflammatory disposition, are more liable to be attacked by most species of infections, than others of an opposite habit; as weakly men or women, or the inhabitants of warm climates; and we often find that weakly children cannot be infected with the small-pox, by inoculation; and those who have been in the East, or West Indies, long enough to get their inflammatory habits worn down, were not so subject to the infectious epidemic here in the autumn of 1793, and if

taken, got easily over it. It was also remarked by Dr. Lining, that when fevers of the same species have prevailed in Charleston; those who were from the northern states, suffered more by the disease, than others; and in tropical countries, it is always strangers who suffer most, by their endemics: but the low nervous fever is an exception to this rule, as it attacks the weak most frequently.

There are many advantages to be gained by physicians being extensively acquainted with the nature, origin, and progress of infectious diseases; they may thereby find that in innumerable instances, they have broke out in besieged towns: especially when accompanied with famine, and in prisons, or hospitals, barracks, camps, or in crowded ships, and manufacturing towns; so that sieges and famines, are generally accompanied with plagues, and they are aggravated by unsound provisions, or from lowness of spirits; for in all these situations, there are causes of discontent, despondence, and neglect of cleanliness, which united with confined air, becoming strongly impregnated with the noxious effluvia, it is no wonder that diseases should break out, and become infectious; and we have sufficient reason to be convinced, that these two principal causes of fevers are often united.

As marsh miasmata, and human infection, as we believe have been often united, when the autumnal fevers contract an infectious nature, as they may do, when under the forementioned circumstances. And these two causes operating together, have been the reasons of their malignancy, and untractable nature. It would also appear that the violence of the disease, is in proportion to the strength of the infection, and the predisposition in the habit of the patient, as age, sex, temperament, &c. or the preceding operation of marsh effluvia, or other predisposing causes, upon those who are infected; so that their varieties are infinite. In the warm climates, there is seldom any suspicion of fevers or fluxes becoming infectious, among those who live on land, even by their physicians.

For private practitioners, either in the East or West Indies, do not allow their diseases to be infectious, whilst

at the same times, and places, practitioners on board of ships, or in hospitals, or attending armies, have found diseases of the same origin become infectious; so that when a fever, or flux, breaks out in a ship, it will rage in her, attacking all hands, but principally those who sleep nearest the sick; whilst at the same time, other ships lying near them, in every article the same, except the infection, may be almost totally exempt from it, especially if they cut off all communication with the infected ships: these circumstances are, we think, strong enough proofs of those diseases being infectious; for were they merely endemic, and caused by the local state of the atmosphere, every ship's company under the influence of the same air, would be equally affected.

The reason why the fevers and fluxes of warm climates, are so seldom supposed to be infectious on land, while the effects of their infection are so often felt on board ships, is not difficult to be discovered. In warm countries, the inhabitants generally have their houses built in an airy manner, often without ceilings, with large airy rooms, which are constantly well ventilated, by keeping the windows and doors open, and using every means to procure a succession of fresh air through them. Therefore if one should be even infected, in a crowded ship or hospital, and when taken ill, should be removed to one of these well ventilated rooms, there would be no danger of his infecting any other person with the disease.

The pestilential infection which so often rages in the largest sea-port towns here, seldom affects the country, on account of the purity of the air, and ventilation. But where a number of men are confined to a small space, as they are in ships of war, without sufficient ventilation, fluxes, or remittent fevers, will become infectious; and accordingly, most of the medical men, who have wrote on the diseases of the East or West Indies, from observations made on board ships, allow that these diseases are infectious; whilst those who have made their observations on shore, as strenuously insist that their autumnal diseases are not infectious. Certainly it may appear at first sight, an inconsistent contradiction; but though these accounts are



in exact opposition to one another, yet both may be adhering to the truth, so far as their own observations extended—their difference of opinion, being caused by their not having examined the subject, in different points of view; and on this account, relations of diseases, their manner of spreading, treatment, and cure, are so differently described by authors, and practitioners of credit: whereas it is certain, had they not too often drawn hasty conclusions, from over confined spheres of observation, they might have been much nearer to each others opinions, as well as to truth. In our arrangement of fevers, we shall proceed from the most simple, and least dangerous, to those which are more complex, difficult of cure, and most dangerous.

In the first place then, we shall treat of such as are the produce of vegetable putrefaction, caused by heat, or the effluvia of marshes, or stagnant putrefactive water. These are intermittents (or agues) and remittents; and secondly, those caused by human effluvia, or infection; the mildest species of which is the (typhus mitior) low nervous fever, and then the (typhous gravior) or jail fever, all of which become malignant, in proportion as people are crowded together, and low-spirited; and as poverty, depression, and a neglect of cleanliness, prevails principally among the poor, whether in the country, in villages, or towns. In the last place, we shall mention a species of fevers, which partakes of the natures of the two foregoing, from the productive causes, which are of course very complex, and untractable, as it appears to partake of the most malignant, and untractable nature of both, in their greatest violence. The low nervous fever, we believe often arises without any infection, from the causes before mentioned, and bears some analogy to remittents; we may consider it on this account, as the lowest and mildest state of this class; but it may become infectious, by the other causes above explained. A common ague, or intermittent, is the most simple and mild species of fevers; but may be aggravated, by an increase of the predisposing causes, as agues turn to remittents, of more or less violence, approaching to the continued type,



with an increase of danger. And the simple low nervous fever, may be combined with the catarrhal fever, and become more virulent by infectious effluvia, so as to form the malignant jail fever, or typhous gravior; and these two causes of fever may sometimes meet together, with all their concomitant circumstances, increased to a great height, as human infection, and marsh miasmata; and then they must of course produce the most virulent, and destructive fevers, with which we are acquainted at present, as the pestilential, or yellow fever.

From all that we can collect of the nature of infection, it appears that there must be some new, or uncommon circumstances concurring to generate it originally; we may observe that it is the nature of all infections to become milder, or to wear themselves out through a continuance: for all the infectious diseases, of which we have accounts, have uniformly followed this course after some time. Were there no new subjects for the small pox, or measles, they would soon become extinct. And were there no new subjects for the pestilential fever in the West-Indies, and no winters to make the inhabitants of the United States, again susceptible of the infection, it would in all probability soon become extinct. People of distant countries who have never had any intercourse before, meeting together, have often communicated, and we believe generated infections. Even people of the same country coming together, after having been long separated, have sometimes been known to breed infectious diseases; which neither of them had before. Something of a nature similar to this is mentioned by Dr. Lind, to have happened from mixing different ships companies together. And we have very great reason to believe that the syphilitic infection, was not known either in America, or in Europe, before the discoveries of Columbus. The doctrine is new, but there are strong presumptive proofs in its favour: for there are no accounts, traditional or otherwise, of its being either on the continent, or in the Islands of America, until they were visited by Europeans. All the information, which these three centuries have produced, would rather confirm our belief, that the disease did not

exist before this period in America; and we are still more certain that it was not in Europe in its present form before this period.

The small pox, and measles, also have been introduced into Europe from the other side of the world. We have often wished that the Chinese, and Gentoo annals, had been searched, in order to discover their origin, or their first appearance there. The first accounts we have of them, are those of their appearance in Arabia, in the city of Bagdad, about seven hundred years ago. At that time the Arabians were a powerful nation, and carried on a considerable trade to India, and China; on all the Sunda, and Philippine Islands, the inhabitants of the coasts, appear to be descended from the Arabs. What little religion the Malays have among them, is of the Mahometan origin; and some of them can trace back their pedigree near seven hundred years to an Arabic extract; as the Sultan of Magindino did, of whom Captain Forrest gives an account. From the circumstance of the Arabs trading to these countries at the time the small pox, and measles first appeared in Arabia, it is highly probable, that they brought these diseases from the east: but whether they were known there long before this time, or were generated by this intercourse, we have no account. But they might have been generated from milder diseases, being aggravated by their introduction among a people, who before were strangers to them; as appears to be the case with all new infectious diseases, but in this, as we cannot be positive, we only wish to shew the probability of it, that it may be investigated in future.

The modern communication between distant countries, by means of ships, is a much readier manner of conveying infections, than caravans, or armies, for travelling by land is so much more tedious, besides they could not so easily carry sick persons by land as by water; and there are more frequent opportunities to leave them until they recover, when on land, than at sea.

The origin of the pestilential fever on the coast of Africa, in the Bulam expedition and its introduction to the West Indies, as related by Chisholm, is to me a very sa-

tisfactory account of its origin and progress; having seen the beginning of that unfortunate affair, whilst in London, after my last voyage to India, this information was the more acceptable to me. A former friend of my own, who solicited me to become an adventurer in that scheme, may yet remember my predicting their fate from a little knowledge of the people, and of the adventure in which they were setting out. A number of people bred in London and other large towns, unacquainted with the climate, and even with the agriculture of their own country, at once intending to become planters on the coast of Africa, was an adventure almost too great, even for the most speculative enthusiasts, but the mania of the times, the abolition of slavery, and the acquisition of large and rapid fortunes, were urgent motives.

In the settlement at Siera Leona, which had been formed only a few years before this, there were no larger grants, than seventy acres of land given to settlers: some gentlemen adventurers wishing to become possessed of large estates, were displeased with the smallness of these plantations, and formed an association in London in 1791; and by several pieces in the news papers, and flattering prospects of gain, disseminated in public companies, subscribers soon became numerous. For 30l sterl. each adventurer who went out was to have his passage, and six months provisions after their arrival, and 500 acres of land: and for 60l. subscribers who stayed at home were to have the same quantity of land; so that by the end of December there were about 500 subscribers. Two vessels were chartered to carry out the colonists, and their utensils, &c. which sailed early in 1792. The island of Bulam 200 miles northward of Siera Leona, was to be their rendezvous. It is in latitude 18°. north, near the mouth of Rio Grande on the coast of Africa. This island and the neighbouring coast they expected to purchase of the natives, whom they also intended to hire as servants, to labour along with themselves, in clearing the ground, building houses, and cultivating sugar canes, &c. Some of the adventurers were so enthusiastic in this project, as to approach very near to a state of insanity. But when they

arrived at the destined island, the natives were hostile to the measure, and killed some of those who ventured on shore ; so that they were obliged to remain on board their vessels. Here they were in a situation the most likely to create infection, disappointed in their golden dreams; not used to the climate, dispirited, and in such situations landsmen are commonly negligent of cleanliness ; they were certainly fit subjects for diseases. The other particulars as related by Chisholm, of the disease, and mortality among them ; which he had from some of those engaged in the expedition, carry every appearance of being correct. But my admiration is excited by the pretensions of those who, from their speculations at home, deny the reality of the pestilential infection raging among these people, although attested by witnesses present, that they lost more than half their number by the disease ; and introduced it wherever they went, in the West India Islands, and in ships of war, &c. The indiscriminate use of mercury recommended in this disease, even in the inflammatory stages of it, is another subject which my practice never led me to adopt, and probably never will, in any case where true phlogistic inflammation is present ; in this we must yet differ in sentiment, until conviction produces a change. In this expedition as well as in ships of war, military hospitals, or prisons, men were in a situation to breed infection, and in such situations, we have no reason to doubt of its originating ; for here are both the predisposing, and occasional exciting causes present.

From all that we can collect on the subject of infection, by experience, and reason, it appears that, in order to produce unusual diseases among men, it is necessary that they should be placed in unusual situations ; was this not the case, uncommon appearances must soon become common—collective evidence alone is to be acquired in some cases ; reasoning from effects to their causes, must be allowed, where sensible demonstration is impracticable.—War, famine, &c. have put men out of their ordinary courses of life ; they have therefore been commonly accompanied with pestilential, and other severe and uncommon diseases. Ships of war, military prisons, and hospi-

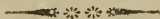


tals, on account of their being much crouded with men, are the most proper nidus's for infection. Besieged towns have been commonly affected with violent infectious fevers; and in times of famine, pestilences, &c. have commonly prevailed; as we find this to be the case in all times, and in various places; how can it be applied to the United States of late years? We entertain no doubt but infectious fevers might originate here, were the circumstances necessary for their generation present; but no such causes have been in existence, these ten years past in the United States; therefore, from all the circumstances considered, we are fully convinced of the importation of the infection. We also believe, that they are oftener generated on board of ships of war, transports and passenger vessels; although they sometimes break out in military prisons, or hospitals, especially when in unhealthy situations, crouded with people not habituated to warm climates; from much research and investigation, we are persuaded of this being the case, without prejudice, or partiality, to any opinions, or principles. On considering the circumstances of the generation, and propagation of fevers; we are convinced that a pestilential fever, such as has repeatedly raged in different towns of the U. States, might certainly be generated here, as it is so readily propagated, did the circumstances necessary for its generation exist, in these towns; but we are also firmly persuaded that no such circumstances have existed here; therefore we believe that the disease was brought from where they did exist, on the coast of Africa, and in the West Indies.—For could this disease have been generated here, at one, or more times, under ordinary circumstances, it must have often happened before, as well as since its appearance here in 1793, and would not have been forgot by the inhabitants. Another circumstance to be mentioned, is, where a disease is generated, it must, and always does begin gradually, and becomes the more virulent as it spreads; whilst its season continues; but an extraneous infection always breaks out with most virulence at first, and is mitigated by its continuance in the same place.



For scarce any person can infect himself, even with a contagious disease, as the syphilis, &c. nor will those people, with whom we have frequent intercourse, so readily communicate infection, as those whom we meet for the first time. For habit observes its laws in this, as well as in every other case, or circumstance. If we are habituated to noxious effluvia, we are not so readily hurt by it, whether it is of animal, or vegetable origin; this is an observation so common, that scarce any diligent, and rational observer of physical, or even mental occurrences will deny it; for it is allowed that all passive affections, lose their force by repetition, or a continuance of the same impressions: so that a violent fever has been generated by prisoners from their cells, impregnating the air; and the judges, jury, &c. have been infected, and died, the prisoners having no fever among them at the time their effluvia was so active. Different ship's companies have generated fevers, by being mixed together, when at the same time there was no fever, in either of their former, respective ships. Strangers being brought together, who have never, or very rarely met before, will be very liable to generate infection, in other situations, as well as on board of ships: especially where they are crowded together, as in besieged towns. And however difficult it may be to prove in the present days, there are strong evidences that the syphilitic infection was not known on either side of the Atlantic before Columbus's discovery of America! For here was a meeting of people, who never before had, either a direct or indirect intercourse, with one another. And as all impressions are the stronger, in proportion to their novelty; this appears to be a strong presumptive reason, in favour of our position.—In order to prove this doctrine, we are not even under the necessity of discovering any new laws, or properties of the animal œconomy, for there is no property of animal life better understood than this; for all applications, to which the body has not been used, or habituated, whether as food, drink, air, or medicines, produce their effects in the strongest manner, on their first application; this is the reason, why all changes should be made very slowly and

gradually : for many articles of regimen, or medicines, whose effects have not been experienced on the body, must be used sparingly at first ; or otherwise they may often do hurt ; or even act as poisons : and poisons in very small quantities may be converted, by good management, into some of our most powerful medicines : for all poisons, except those of animal origin, have been used medicinally ; and many of our best articles of food, and drink, used to excess, by those not habituated to them, will act as poisons ; and we are also well assured, that all infections will act on similar principles, and laws ; whether they require actual contact, as contagions, or infect through the medium of the air ; so that the power of habit, &c. will explain much of the mode in which infections operate on mankind.



*An Answer to Dr. ———'s objections to our Origin of  
Infection.*



*Philadelphia, March 16th, 1796.*

DEAR SIR,

I AM much obliged to you for the freedom, with which you communicated to me your objections, to one part of my paper on the causes of the infectious fevers, especially as it gives me a seasonable opportunity of answering them.

This is an abstruse subject, and the result of observation is the only way we have of coming at the truth in it ; as the making experiments on this subject, are scarcely practicable, and too dangerous to be attempted ; neither need we regret it, as the opportunities for making observations, from natural causes and effects, occur as often as we could wish for them.

Your objection to my opinion of the infectious pestilential, or yellow fever, being produced by a concurrence of the causes, of the worst variety of the autumnal remittent, generated by noxious airs, and that species of fever produced by human effluvia, such as is produced in jails, ships, or hospitals, or other dirty, close, and ill ventilated habitations. You say that it is not philosophical, to account for it in this manner; and you suppose that one cause would obliterate, destroy, or neutralize the other: we shall compare these opinions, with observations and experience, and examine candidly how far they are agreeable to facts; and adduce proofs in favour of that which we find nearest the truth. As to its not being philosophical, to investigate causes from their effects, and to pursue truth wherever it may be found, in an obscure subject, certainly it cannot be unphilosophical. I know that Sir Isaac Newton lays it down as an axiom, that, No more causes of natural things ought to be admitted, than are known to exist, and are sufficient to explain their appearances. This we by no means contradict, but perfectly agree with him: as we believe it cannot be shewn, that any fewer causes ever does produce the species of disease under consideration, than have been assigned, although it is often produced when they are present; but even if experience shewed it to be contrary to the commonly received opinions of philosophers, it might in some measure correct philosophy, as there are many important discoveries, both in philosophy and medicine, since Sir Isaac's days. But Newton did not pretend to prescribe laws to nature, but confined himself carefully to observe her operations, and faithfully and diligently, to describe them. The case is exactly the same with physicians; and whether they are general philosophers or not, they may be allowed to deduce consequence, from accurate observations, and their own experience, as well as from that of others, on whom they can depend, for accuracy and truth. But in my mind, he has but an indifferent claim to the title of a physician, who is not acquainted with all the information, which modern physical science reflects, on the secret operations of nature, either in the human body, or

in other animals, or in any other subjects. Your idea that marsh miasmata, and infectious human effluvia, neutralize each other, is to me a novel doctrine, so that I could scarcely suppose you were speaking as you thought, when you said that these two great sources of fevers could not operate in combination, but would destroy each other: this is an idea so very new to me, especially with respect to fevers and fluxes; and so different from what I ever learned before, either from my own experience, or that of creditable practitioners, in similar cases, and in various parts, that I can view it in no other light, than as a gratis dictum, or an unfounded assertion; and cannot avoid considering it as rather unphilosophical, according to the modern acceptation of the term, and therefore, more like hypothetical speculation, than experimental science.

Were we bound to simplicity, in accounting for the origin of fevers, even those of the most simple nature, we must allow that there are predisposing, and exciting causes: or both external and internal causes of all fevers; even the most common intermittents, and remittents, and that which is produced in prisons, &c. called the jail, or typhus fever, which is generated and propagated by human effluvia, and infection: now, to cause this last, there is commonly want of pure air, dirtiness, deficiency of, or bad food, depression of spirits, and discontent, or the effluvia from sores, or dysenteries, &c. and besides marsh miasmata, there is a predisposition in the body, and often obstructed perspiration, to excite remittents, and intermittents. Were there not predisposing causes, existing in the bodies of those who are taken, we might expect every one who is exposed to the same causes, to be equally affected with the same diseases; which never is the case in any epidemics. But let us have recourse to experience, and inquire from authors of the greatest credit, and veracity, accurate and extensive observers. At the head of the list we may place Pringle, whose observations on the diseases of the army, never were exceeded in any age, for accuracy of observation, although some parts of the practice is improved since his time; in his book, we find a great



number of observations, to confirm what is advanced.—He always dreaded infection, when there were too many of the men in one hospital, whether they were sent there with remittent fevers, or fluxes; and whenever these diseases become infectious, through want of ventilation, &c. they also became very malignant, and complicated; and although the dysentery, or even putrid sores, sometimes caused the infection; yet they all degenerated into the infectious autumnal remittent. And both the dysentery, and the remittent fevers, he says, were frequently combined with the hospital fever. I have no doubt but when this last species of combination occurs, it will soon obliterate all the others, as Pringle mentions of the infection, which broke out in the village of Feckenheim, in the year 1743, from its being too much crowded with dysenteric patients, which by confinement, became as infectious as the plague, one half of those taken, dying of it. Likewise after the battle of Dettingen, in June 1744, a great number of the men being taken with the fever at once, by lying wet in the rains after the battle; that fever became infectious, and raged violently. And both at Brussels, and Antwerp, in the autumn of 1745, he says the diseases were complicated with the infectious hospital fever. And the same year, as the men were a carrying over from Holland, to England, to suppress the Scotch rebellion, some of the people, being taken with the remittent fever in the vessels, it was soon communicated by the confined air, and the crowds, and converted into the infectious ship fever, of which near one half of those taken died. And in a note, he says, the putrid effluvia of dysenteric fœces, are not only apt to propagate the dysentery, but likewise to breed the jail, or hospital fever, either with, or without bloody stools. And also that these diseases rage most from August until October; and that then they become infectious, and are so much the worse, if the summer has been hot, and the men in unhealthy, close, marshy situations. And the morbus hungaricus, he says, from Senectus's account, was a compound of the bilious, (the name he gives the autumnal remittent) and the hospital fever, taking its rise in the camp, and having its malignan-



cy heightened from the foul air of the places into which the sick were crouded. And Sylvius de la Bœ, describes a fever which raged at Leyden, in 1669, of the same nature, caused by a remittent becoming infectious. Pringle, we observe, uses the terms, infection, and contagion, synonymously; and so does many other modern authors; it is nevertheless, an impropriety; for contagion means the communication of a disease by contact, as the itch, or syphillis, but fevers do not require contact, and therefore Dr. Lind has made that distinction. The epidemics described by Lancisci, at Rome, and in other towns of Italy, one hundred years ago, began in the autumn, from marsh effluvia, and soon became infectious, from the numbers taken ill, and the confined air. In Rome the fevers raged only in that part of the city, next to the marshes; and all these fevers became very infectious.

But we may come nearer home, and find that autumnal remittents will become infectious in populous towns; for whether infection is imported, or not, we see that these destructive diseases will not take place, until the inhabitants are prepared to be affected: or susceptible of, and predisposed to remittents, or fluxes, by the heat of our summers, as we know was the case at Philadelphia, Baltimore, New-York, Norfolk, and Newhaven, and often in Charleston; we will find that these diseases always raged between July, and November, the very time at which remittents occur annually, and no one can well deny their being infectious; and whoever has seen the typhous fever, and the autumnal remittents, separately, will be convinced that there is a combination of the two, in the yellow fever; as to Sir John Hunter's opinion, it is true, I know, with respect to some diseases of very opposite natures, that they cannot affect the constitution at the same time, but the one will lie dormant until the other is over, and then break out; some instances of which we have seen. But fevers and fluxes are not so inimical to each other, they are nearly related.



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AN

A N A L Y S I S

OF

*MEDICAL SURGERY.*

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OF all those who have wrote on the diseases of warm climates, there are none who have paid any attention to this most useful part of the profession. Neither should it have been taken notice of here, had we not been in various situations and places, in which we have often witnessed the want of a little information of this nature. For however much it is to be regretted, it is not every one who lives by the profession; and often with the nominal appointments of surgeons, who are adepts in this art. An inquiry into the sources of this abuse, and the best means of affording a remedy, is in some measure connected with our subject. When this is the case, we cannot wonder that the more abstruse subjects, of searching out the causes, and connexions of the whole circle of epidemic, and endemic diseases, and their connexions, have often been passed over in a very superficial manner; for the physical nature of the human body has scarcely been taken notice of, by those practitioners who have wrote on the same subjects.

Medical surgery, as a necessary branch of medical education, has been fully treated of, by Dr. Kirkland, in his inquiry into the present state of medical surgery.—Also by Dr. Bœrhaave, who, although unfortunately no practical surgeon himself, yet he was so fully convinced of the necessity of understanding it, that he shews plainly, “that without it, nothing true or certain can be learned in the practice of medicine.”—We have always esteemed this sentiment for its candour; and the more we learn of the principles and practice of the healing art, the stronger is our conviction of its truth, in a still greater and more accurate degree than a theoretical knowledge of the subject, and in actual practice, for a course of years, before admission to the internal practice, by this means students would learn the nature of the living human body, in the only true manner in which it can be studied effectually, &c. The habits and temperaments of men, and likewise the effects of medicines on them, are more accurately observed by a surgeon attending to the dressing of sores, &c. than they ever can be by a physician, in his formal visits, particularly one who has never attended to these circumstances. And as all science, must be founded upon something cognizable to the senses; this, of all other pursuits, is the most proper for a physician to lay his foundations of medical practice upon; here in attending to inflammations, their varieties, and modes of cure, he may learn how internal affections of a similar nature are to be treated; whether erysipellatous, phlegmatic, or rheumatic, &c. and their different terminations, with the best means of obviating them, the difference between an erythematic, and a phlogistic (diathesis) or disposition.

Although plain demonstrative anatomy has long been known accurately, these are subjects of much more importance. The properties of the vital principle; the physical nature of the human body, and of animal life in general, is yet in its infancy; for it is but lately that we have got into the mode of pursuing the subject experimentally, and rationally, from which alone, useful information can be found; the practice of surgery, is familiarizing us to the actions of the vital principles in the



different temperaments, and in the different varieties of inflammations—Sores, or ulcers, &c. forms by far the best introduction to an accurate knowledge of the internal affections of the human body; this is one essential mode of instruction, together with the fore, and after treatment, of operative surgical cases, which occur. Here an accurate physiology is of the greatest use, to direct practice, and it also reflects much light back, upon the vital properties of the parts, by which real information is gained: as from the sight, we acquire a knowledge of the external appearance of a patient, and by the touch, we determine the state of the skin; and by it can judge of the stomach, &c. as also of the pulse, and its different states; the effects of applications to sores, and to the skin, &c. are lately found to be very nearly allied to their internal actions—Our late discoveries on the irritability, sensibility, vital energy, and inherent strength, by means of some new experiments; and the doctrines of sympathies, &c. are highly useful in the investigation of the vital functions, sane, morbid, and curative, all these are important discoveries. These are the pursuits, which lead us in the right path to the cure of diseases, and an acquaintance with the animal œconomy; this being an experimental method of pursuing these subjects, will fix every part of the acquired information in the mind; and by this means we become acquainted with the effects of constitutional varieties, and the different effects produced by external impressions.

A diligent investigation of medical surgery, or the art of healing, leads us from the confined sphere of a routine practice, to more extensive views of the nature of the human body; this is necessary whether we use external or internal medicines. For without knowing the properties of the active principles, we cannot prescribe with propriety; even the use of the knife, and of external applications, are but a small part of a surgeon's duty. For although a clean wound, in a healthy person, will heal by retaining its sides together, and excluding the air, by almost any ointment, or plaister; yet there are others which require different treatment; which can only be learned

by actual practice in dressing, discriminating the different appearances they assume. Neither is this accuracy to be acquired by the common modes of hospital practice ; for there are seldom time enough bestowed on them, to pay proper attention to one tenth part of the number. And unfortunately whilst the mechanical, or operative part of surgery, has been pursued with avidity, the scientific, or healing part, has been almost totally neglected, or left to the care of nurses, or the patients themselves. Some fores require stimulant dressing, and others emolient, or soothing applications ; but this is only to be learned by practice. An illiterate person might soon be learned to take off a limb, but it will require the abilities of the best informed practitioner to save one on many occasions.— And we have sufficient reasons to be convinced that many limbs have been amputated, which might have been saved without the eclat of an operation. But where it is absolutely necessary, to do it well, is commendable ; but it is only by a proper attention to medical surgery, that this information is to be acquired.

No one can practice rationally, unless he is acquainted with the varieties of temperaments, &c. and the actions of the different medicinal applications, when applied to them. Therefore, it is impossible to be a good surgeon, without being a physician ; neither can there be a good physician, without being in the first place a good practical surgeon. For stimulant purgatives, such as jalap, and calomel, given in irritable habits, will increase the discharge from ulcers ; so also, will yellow basilicon, and other such stimulants. But pultices, fomentations, and ointment of spermaceti, cerate, &c. will relieve them : and different states of the body, require very different remedies, both external and internal. But although an illiberal disposition is a certain criterion of a narrow mind, and professional ignorance, yet acquirements do not always produce candour. The nature of the human body must be studied on its own principles ; and improvements must be searched to their origin, and traced down to the present times.

In cases of mortifications, nothing but former practice can direct a person how to proceed; here living information is wanted, which language cannot communicate; it is exactly the same with injuries of the head, requiring the trepan, or not. A physician who has not been in the practice of surgery, giving his opinion in affections of this nature, is only a random proceeding. For language never can qualify him to judge in these circumstances; and his viewing the part, or not, is a matter of indifferent formality. The appearance of ulcers often point out the state of the body, and indicate the proper medicines. But where inflammations are present, the touch, and the smell, are often as necessary as the sight, for this purpose. A person who does not know by the inspection of a sore, when stimulants, or strengtheners, should be used, will certainly do hurt, by using them indiscriminately. Therefore, practical, and not ideal knowledge is necessary. Those who lay the foundations of their practice on facts, have fixed principles to go upon, and are steady in practice, and not volatile and changeable.

Surgery being the most obvious part of the healing art, the practice of external applications leads us by analogy to the knowledge and cure of internal diseases. Boerhaave's sentiment that unless Surgery was first learned, there could be nothing good or true learned in medicine, for it leads us from what is visible to the more abstruse operations of nature. Irritation and inflammation of an internal part of the body, are similar to the same when in an external part, and requires similar modes of treatment, and there are the same varieties of Phlogistic (or true) and Erysipelatose, (or spurious) inflammation takes place in the inward, as in the outward parts, and inward mortifications also proceed in the same manner, and are attended with the same symptoms, as when on the surface of the body, and of all the list of diseases, there are scarce one natural occurrence takes place, in the inward parts, but has some one, or other analogous to it, externally: as the inward parts are composed either of muscular, membranes, or vascular and nervous parts, as well as the outward parts, their various affections must

also be the same; so that there can be no doubt, but learning the treatment of the diseases of the visible parts, is the only certain introduction to that of the invisible, for otherwise we can only apply remedies by conjecture, a mode of practice which, it cannot be denied, is but too common. But an inflammation of the first passages, is not so easily discovered, as that of most other parts, it is attended with a small, quick pulse, and a fever. But in a cholicky, or spasmodiac pain, there is no fever. Injuries of the substance of the brain, do not affect the pulse much, but when the membranes are affected, it becomes hard, and quick.

For inflammations of the brain, or its membranes, of the lungs or their surrounding membranes, of the stomach, liver, intestines, kidneys, bladder, &c. being either phlegmonic, erysipellatous, in all these parts, causes all the varieties of their inflammatory affections, and schirri of the liver, spleen &c. are of the same nature with that of external glands: and hectic, from absorbed matter, is the same whether the ulcer is in the lungs, or on the surface of the body. But in other inward parts of the body, the absorption of matter will not cause a hectic, because of the exclusion of the air from the matter, without which, hectic never is produced. The application of infectious matter to the surface of the body, and the putrid matter absorbed from sores, demonstrates their effects on the parts. The application of balsams and oils to sores, produces much the same effects, as their internal use does; but the balsams are not to be used where there is inflammation and heat; but here the oils answer well.

Tar water has been famous in nervous coughs, and also G. myrrh, and gum ammoniac. And balsam of Peru, and essential oils, have been highly serviceable in nervous, or flatulent cholics, as well as in indolent sores. Bark, or rhubarb, are useful in irritable and foul sores; and mercury acts on sores, as well as when taken inwardly: and the action of most medicines on sores, bears some analogy to their effects on the stomach, &c. When emetics, or purgatives, or any other medicines, or stimulant food or



drink are taken, their effects are soon visible on sores, to those who pay a proper attention to them.

A woman of fifty years of age, had a putrid ulcer on her leg, which mercury rendered worse; but bark reduced it to a healing state. Another of the same age, of a phlegmatic habit, with a pale, torpid ulcer on her leg, took steel wine, with camomile tea twice a day; and with regular dressing, it soon recovered. These are small specimens of the information which we obtain, by a diligent attention to sores, in unveiling the whole animal economy.

Here it may be proper to remark, that the practice of surgery, as well as of anatomy, is the most proper introduction to the practice of physic; and that every student should be confined to this part of the profession, for a number of years, (say seven, or even ten) before they are permitted to practice, in the more abstruse parts of the healing art, where life and death are to be determined on: for how can a young man from the schools, having only read books, and attended lectures, be supposed competent to this arduous undertaking; even although he has served an apprenticeship with a practitioner, and attended hospitals, which are by far the best introductory means, yet in either of these, they can be little more than spectators; nor indeed are they fit to be any thing more, unless in minor surgery, where as dressers, &c. they may be advantageously employed. Having the actual treatment of inflammations, bruises, wounds, ulcers, &c. here the effects of the injuries, and of applications, and the varieties of constitutions, are obvious to the senses; and a knowledge can be acquired which language is incapable of communicating. Hence the advantage of experience—imbibing information from sense, and reason; and its just preference to that from language, as this fixes it in the mind, in a manner which language never can equal, in its greatest perfection, &c. And this is the only just ground I know for a division in these parts of the profession; that surgery should serve as an introduction to physic, as the preliminaries, the principles, and properties



of both are the same ; and a proficiency in one serves for a proficiency in the other.

A general and particular acquaintance with the laws of animal life, in health and in disease, and particularly of the physical constitution of the human body, is essentially necessary to every one who would practice in any department of the healing art : without this information, it is impossible for any person to practice scientifically, in any one department of the profession ; but with it, and only common talents and application, surely it is not going too far to say, that one person may and ought to be qualified, in all the departments of this scientific art ; for the practice of every single part, has a tendency to elucidate, both the principles and practice of every other part of the profession. As for example, suppose a person to have received a bruise, or a wound, it depends very much on the habit of body, and the physical constitution of the patient, how it will terminate ; for if he is of an inflammatory, or hale, robust habit, an inflammation will ensue, in proportion to the cause, &c. but if on the contrary, he is of a weak, erythematic habit, spasms, convulsions, or erysipellas may succeed ; or many other varieties of affections, in proportion to the cause, and the part injured. Here, and indeed every where, any one ignorant of human physics, must act his part as a surgeon, but very precariously ; for it is essentially necessary, that the physico-chirurgeon, should both be able to discover the present state of the patient, and likewise the best means of curing his morbid dispositions, of whatever nature.

*Wounds—Incised, Contused, and Lacerated.*

THE present performance is not intended for proficients in the practice of surgery, especially for those who cultivate this as a distinct part of the medical profession: although we can venture to assert, that there are some particulars to be found here, which are not generally known even to them; its principal intention is for those persons, and places, where proficients in surgery are not to be found. Although popular books of medicine are to be found, almost every where, at least so far as the English language is in use, yet there are none that we know of wherein this most necessary part of the healing art makes a part; if we except Dr. Buchan's popular work, who, not being himself a practitioner, his directions in this part of it, bear the marks of his little acquaintance with the subject—they are copied from others indiscriminately; and as we have repeatedly witnessed the deficiency of this branch of popular information, it is our wish to make an essay in supply of the deficiency. On board of vessels which do not carry surgeons, and in numerous situations in the country, we are persuaded that a little information of this nature, made plain enough for general readers, is very often much wanted, and not to be found in convenient time, and in some places not at all.

We shall begin with wounds, as being the most common affections we are apt to meet with; they are so generally known, that a definition would only add obscurity to the subject. When the muscular parts are wounded through the skin, and cellular substance, with a clean and sharp instrument, the wound only requires its sides to be brought together, and there retained in contact; with a covering of any mild ointment, in order to exclude the external air; and by this means a cure will be accomplished, which will take place in three, four, or five days, &c. This

is, of all the methods that ever were devised for the cure of wounds, the most easy and speedy; for there is in those, whose habits of body are in a good state, just so much inflammation takes place, as is sufficient to produce the inflammatory adhesion, between the sides of the wound: in the same manner as inflamed membranes, or any other surfaces of the body, will adhere and unite, when kept in contact: this is what has been called healing by the first intention. But there may be several obstructions to this mode of healing wounds, as a bad habit of body, which will require the same medical treatment, as the appearances may indicate; so that if they are very inflammatory, bleeding may be necessary, and gentle cooling laxatives, such as salts, castor oil, and antimonials, &c. and in case of great weakness, they may require strengtheners and cordials; and where there is any thing of a syphillitick nature, it requires its own proper treatment, before the wound will heal, &c. One of the most alarming circumstances which takes place in wounds, is the discharge of blood which follows, especially where it is a large vein, or an artery is wounded: an artery is known by the starting of the blood, keeping time with the pulsations; and that of a vein, by the uniformity of the stream; this distinction is necessary to be attended to, because wounds of the arteries are much more difficult to stop, than those of the veins; but in either case, the patient, or bystanders, should make a pressure, as they may often see done after blood-letting, with the thumb on the part, and immediately apply some linen rag, or lint, if at hand. As the blood in the artery is always running from the heart towards the extremities, the pressure should be made in them, rather above the wound, and in the veins below it; the arterial blood is of a florid or scarlet colour; the venous more of a dark, crimson colour. When an artery, or large vein is wounded, the patient should be kept as quiet as possible; and if it is a large artery, he should be watched whilst he sleeps, at least for the first night, lest it breaks open during sleep. Nitre taken inwardly, in as large quantities as the stomach will bear without vomiting, is very useful in stopping profuse bleed-

ing, with quietness of mind and body, and a sufficient degree of pressure, properly applied to the part, by bandages, compresses, &c.

But a blunt instrument will bruise, as well as cut; and a rough, or saw edged one, will also lacerate or tear; and a rusty one, may partake of both these inconveniencies, with the additional one, of leaving some of its rust in the wound; and brittle substances, such as glass, may by breaking, leave some of their fragments in the wound; or even steel instruments sometimes break. In this situation, the extraneous substances must be extracted if practicable, or if not, left until they are discharged with the matter, on suppuration; which in all these last varieties of wounds, must necessarily take place before they can heal.

In wounds when in this situation, or when it is impracticable to bring the divided parts into contact, or to retain them together, then a certain number of processes must necessarily take place. A loss of blood always happens in wounds, which penetrate the skin, in proportion to the size of the vessels divided. Arteries discharge it with an uneven, or starting motion, but veins in an uniform stream; an uniform pressure is commonly sufficient with dressing of dry lint, and flour, or agarick of oak, sponge, or puff-ball; and if obstinate, a piece of money, or of lead, may be bound on over the wound, &c. and the first dressing should commonly remain on for three days, or even more in cold weather, pouring some brandy on the part, in order to prevent any bad smell, &c. and by the time that matter is formed, the dressings will separate very easily; and as these wounds open by the retraction of the parts, there must be a growth of flesh, to fill up the vacancy, and also of skin, for digestion, incarnation, and cicatrization.

There have been various directions given with respect to the particular parts wounded; but as we do not mean to go into a detail of particulars, we shall only consider the nature of the parts wounded, in general. When a muscular (or fleshy) part is wounded longitudinally (or lengthways) the parts are easily retained in contact, by bandages; but it sometimes happens that wounds are made



right across (transversely), or obliquely ; when they are in either of these directions, they are difficultly retained close, as the contraction of the muscles draws their divided edges asunder : in order to avoid this inconvenience, as much as possible, the limb, or part must be kept quiet, so that the muscles may be as lax as possible, by which means a limb should be kept bent, if the bending muscles are wounded ; and extended, if it is the extending ones which suffer. In some, rolling the injured parts of the limbs, &c. with a bandage, is of great advantage : it should extend as far as the joints, both above and below the wound, so as to prevent the contraction of the muscles. Sticking plaisters have been used for the purpose of retaining wounds together ; there are in Heister's surgery, some handsome plates, and designs of them ; however, in practice, narrow slips applied along side of one another, answer the best : first applying one end warm, and drawing the lips of the wound together, and then applying the other end, so as to retain them in that position.

There is a detestable practice followed by a certain description of medical men, of sewing, or stitching up, almost every wound. This we have seen and known, to have been done frequently, even in those of the skin, and cellular substance ; that we have often been grieved when such practice has come under our notice : when a few slips of adhesive plaster, would have answered much better, without causing any such unnecessary pain ; for proper bandages and plaisters rightly applied, will seldom ever fail, unless in transverse, and deep wounds of the muscular parts, or tendons, which rarely occur : but even in contused, or lacerated wounds, or such as are made by blunt, or rough edged instruments, it will be of great use to retain their sides as close together as may be, (but this will be better performed without futures, than with them,) so that adhesion may take place in part, and the suppuration will be the less, and the stages of the formation of matter, filling up, and skinning over, may be the sooner accomplished : which in those of good habits of body, will proceed uniformly, from the beginning to the end, in proportion to



the magnitude of the wound, but when they assume a foul state, we may treat them as ulcers.

Although in a recent wound taking place, in persons of good habits of body, the blood answers better than any balsam; and in the advanced stages, when good matter is formed, there may be no other application necessary, than dry lint: yet the native balsams, and oils, may often be of great advantage, as when there are great pain, inflammation, and a dryness of the wounds; olive oil poured into them, or the lint soaked in it, gives immediate relief; balsam capivi, will answer better, where there is a torpor, with a livid colour of the parts; and if there is much foulness, &c. oil of turpentine is useful.

There have been varieties of ointments in use for the cures of wounds, almost every nurse, and ignorant pretender have their own peculiar compositions, which must be supposed to have some peculiar virtues, unknown to all the world besides; and of course the composition of them must be kept secret. These good people little know, that wounds will heal by the process of nature if not disturbed; and that every substance in nature have been, at different times tried, in almost every possible manner; and that medical men of sufficiently extensive information, can find their effects in medical books. We here mean those who go beyond the elementary surface of the profession, who read practical authors, and digest them properly.—And who instead of confining their course of study to two, or three years; study for twenty or thirty years, and trace the sources of practice through thousands of authors, down to the present times, and compare this with their own practice.

In healthy wounds all that is required of the ointment is to exclude the air, without doing injury; therefore it should be of a proper consistence, neither too soft, nor too hard; for where other qualities are wanted, such as medicated applications, we must have recourse to the balsams, and oils; because the ointments are only meant to cover the surface, and to keep it soft, and easy; a few varieties of them may therefore answer.

Oil of turpentine is very useful where there is a livid, inactive, and foul appearance of the parts; and in all cases where there is an indolent, torpid, or inactive disposition of sores; in this state, stimulant applications are absolutely necessary, to the parts immediately. Sometimes in torpid habits, wounds assume a whiteish, lax, or flabby appearance, though not foul, or discoloured; in these cases emetics, and stimulant cathartics may be given: and also oil of turpentine, or what is milder, balsam of capivi, applied to the part. The drying and stimulant powders, as rhubarb, bark, &c. have been in use; but unless, in the act of skinning over (or cicatrization) we have no high opinion of any powders. Blue vitriol, and red precipitate, are sometimes used in this form, to take down luxuriant, or fungous flesh; but lunar caustic answers better in general—it is also one of the most effectual applications, in destroying the diseased action, and the morbid poisons of corrosive, and other sores, such as that of chancers, corroding ulcers, and even the animal poisons, as that of a mad dog, viper, &c. And from the different modes of action of these stimulant corrosives, and caustics, these causing pain, smarting, and increased action; and that of the bland oils, or balsams, we may be led to determine the different cases, in which they are necessary, from the habit and present state of the patient.

In wounds, we are to attend to the state of the habit of body, and temperament of the patient; by this means we may trace the causes of any deviations, to their proper sources, and consequently the best means of remedying, or obviating them. In healthy persons, it is the regular process of nature, which heals wounds; and this will always be accomplished where there are no obstructions in the way; but it often happens in young, strong, full habits, that the inflammation runs too high; in this situation, it must be lessened by blood letting, unless enough has been lost by the wound; and gentle sedative or cooling laxatives must be used, such as salts, &c. But if the patient is over weak, strengtheners, nourishing food, and bark may be used, and are often indispensibly necessary: and in case of any acrimony, or any causes of irri-

tation being present, such as the syphilitic, or any other virus they are to be treated in the manner suited to their natures.

When luxuriant flesh rises higher than the natural surface of the wound, it must be touched with lunar caustic, blue vitriol, or any drying powder, such as calamine, rhubarb, or bark, and covering it with dry lint, commonly represses it.

There is a great analogy between the internal use of the oils, and balsams, and their external applications to sores; they appear to allay irritation much in the same manner, in both ways of application, by soothing the parts, and sheathing acrimony; in this manner the oily mixtures, &c. allays dry, tickling, or irritating coughs, and even overcomes the irritation of some corrosive poisons; and warm milk, and diluents, appear to be very similar in their modes of action, by diluting, &c. And fomentations and poultices, which we have often used to old sores, where no other applications appeared to produce any durable effects, are well known to ease pain, and probably to produce a new mode of action, in the morbid parts, and consequently a healthy disposition. The application of stimulating substances also, to sores, produce effects by their stimulating properties; very similar to those produced on the system in general, when applied to the stomach; for in both they quicken the torpid energy, only that, as so many parts sympathize with the stomach, it affects the system more generally; the action of the sores is more local, although other parts commonly sympathize with diseased parts, especially with the irritable and less sensible viscera, as the lungs, liver, spleen, &c.

There have been various charms, incantations, &c. in use for the cure of wounds. Of these we may mention one mode of keeping sores in a good humour, by paying particular attention to the instruments with which they were inflicted; oiling and cleaning them daily, and this part of the business was to be done by a proficient in the art; whilst at the same time directions are very sagaciously given to the wounded person, himself, to keep the wound clean, and to dress it daily with some peculiar ap-

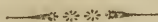
plications. This last part of the process, we have no doubt, is the most useful part of the means; for had the cleaning of the weapon been practised before the infliction of the wound, it would certainly have been very useful in the cure; but after this, we cannot suppose there are any sympathy between the wound, and the instrument, so that the care of this, is only a piece of mummery.—There are various other pretensions to charms, when the whole of the process is conducted by nature, for all pretensions, where there are no immediate applications made either to the wound, or at least to the general constitution of the patient, there can be no rational probability of any advantage being derived from them: but as a healthy state of body is very necessary in expediting the cure of wounds, the first passage must be kept in good order.

We are firmly persuaded, from personal experience, that the proper use of oils, and balsams, will again come into repute, both in wounds, and ulcers: for although wounds, when their cures proceed without any obstructions, in healthy constitutions, require nothing more than keeping them clean, and excluding the air, by the mildest, or least stimulant ointments, such as cerate, spermaceti ointment, &c. or the yellow basilicon, where one more stimulant is wanted; yet in cases of wounds attended with great pain, olive oil, or balsam capivi, or such other oils, or balsams, as may be most convenient, are of eminent service. The myrtle wax, of which candles are made in Carolina, being of a firm consistence, deserves attention in the formation of ointments; with olive oil, an ointment may be formed of any consistence to suit the weather.

In small wounds, or sores, especially on the legs which are often bruised, we never found any application answer better than a very thin membrane, (as it makes no mark under the stockings, it cannot be perceived,) such as a bladder of any animal, when dried, may be divided into, by separating the different layers (*lammellæ*) into which they may be divided, the thinner they are the better; they are to be moistened in order to soften them, and applied to the wound; by this means the air is effectually



excluded; these I first learned the use of on ship board, when in want of ointment, but have often used them since through choice, especially on the shin bones.



*Inflammations, Phlegmonous, and Erysipelatous.*



**I**NFLAMMATION appears to be caused by irritation, in most instances, where we can trace it to its cause, although it depends very much on the state of the body, or the nature of the part irritated, whether the affection will be a true phlegmonous inflammation, an erysipelatous, or spasmodiac affection, or even tetanus, or whether there arises other symptoms, as a symptomatic fever.

An inflammation is known to be present, by a heat, pulsation, and pain, redness, and commonly a swelling of the parts affected, although there are some varieties, &c. but as there are some swellings without inflammation, so are there sometimes inflammations without swelling. But as inflammations are the most common affections which occur in the human body; there are two principal varieties, or rather species of them, as they require very different modes of treatment; these are the phlogistic, and the erysipelatous, or erythematic; the first is the true and genuine inflammation, which takes place in young, strong plethoric persons, of tense fibres and great inherent strength, &c. It is generally accompanied with an increase of heat, redness and pain, and it is generally attended with an increase of the strength and vigour in the vessels of the part. But the erythematic is principally found in weak, irritable, and delicate habits, whose energy is much exhausted by age, exposure to a warm atmosphere, or an over free use of spiritous liquours, or any long continued irritations: what is understood by an inflammatory, in opposition to a nervous habit, are the respective subjects of these varieties of



the disease. Irritations, such as a bruise, wound or fracture, may cause either, just as the habit of body may happen to be predisposed, but an erythema, or erysipelas has been thought peculiar to the membranous, and phlogosis, to the muscular parts; this is often the case: but in phlegmons the pulse is full, hard and frequent, but in erythema it is apt to be small, quick, and unequal, or fluttering, with much nervous mobility, &c.

A capacity of distinguishing between erysipelatous, and phlogistic inflammation is of much importance in the practice of medicine, for as the internal parts are also subject to each of these species, as well as the external, consequently those who are used to pay attention to the state of the pulse, and other phenomena, in these different affections when externally situated, will be the most capable also of determining, by their judgment from the external appearances, when they are seated in the internal parts of the body; this also points out to us, in an eminent manner, the advantages which are derived from the practice of surgery, being united in the same person to that of medicine; for it habituates us to the consideration of the different states of the body; and by this means we learn better than by any other, to pay attention to the varieties of habits, constitutions, &c. whereby we learn to leave the common schoolboy routine, of those who practice merely by the names of diseases, at a proper distance to follow their servile modes, which as they only imitate others, must often be but indifferently applied, with their formulas, of medicines. Attention of this nature will, with a competent knowledge of physiology, learn us to think, and to act with decision, and reason in a bold, but rational manner, and prevent a number of those mistakes, which routine practitioners, and servile imitators fall into, &c.

Phlogistic, or true inflammation, is often an original disease, which never remains long stationary; but erysipelatous inflammations are commonly symptomatic of some hurt, produced in sympathizing parts, by irritation; what is named a symptomatic fever, is derived from local inflammation, caused by a wound, bruise, &c. As the distinction between these species of disease is one of

the greatest importance, and on some occasions, one of the most difficult lessons in the healing art, we would wish that the strictest attention, therefore, should be paid to it. In erysipelas, there is no circumscribed tumour, the skin appears of a bright red colour, which disappears on pressure, but soon returns; and the pain which attends it, is very different from that of a phlegmon: there is little or no tension on pressure, it rather resembles the feel of a mere affection of the skin; we may also remark, that in real phlogistic inflammation, such as occurs in the robust, the pulse seldom exceeds 100 strokes in a minute, and it is at the same time strong and tense, so that those who have been used to distinguish them, can do it readily; but in the erysipelatous, it often goes to 120, and is less tense, or tremulous, this is more common to those of lax fibres, the weakly and indolent: any irritation may cause this state in predisposed habits, &c. it is accompanied with a sensation of heat, and prickling pain, they seem to be in reality two distinct species of disease, both in their natures and treatments, and in their manners of termination, erysipelas never forming matter, nor does it, and phlegmon ever alternate, or change into each other.

A capacity of distinguishing these different species of affections, so similar to each other, will be better comprehended, if we will turn our attention to the consequences of internal, as well as external inflammation, for erysipelas, as well as phlegmon, invades the internal, as well as the external parts, and in this case it is evident that we must be altogether directed by the symptoms, and the present state, habit and appearances of the patient, for in case that he is of weak, and very irritable habit, we may be ready to expect that the disease is of the erysipelatous nature. But if the patient is possessed of great inherent strength, rigid solids, in the prime of life, &c. we have the more reason to expect phlegmonous inflammation; and it appears that the same causes may give origin to either of them, such as punctures, wounds, bruises, fractures, &c. or in short, any causes of violent irritation, as exposure to a hot sun, and some chymical, or mechanical stimuli; so that in forming a just conclusion it is to the habit of body, and

not to the cause of the irritation, that we are to attend for just information in affections of this nature, as well as that of many others.

As to the causes of inflammation, we believe they are all caused by irritations, and irritations have been divided into mechanical, and chymical, but if we adopt divisions, we must admit of a third, which cannot with any propriety be reduced under either of these, as the animal and vegetable, and poisons or medicines, which although they act powerfully on the irritable, and sensible principles of man, and other animals, are independent of any chymical properties hitherto discovered, for we could not foretel by any chymical analysis, *à priori*, how they would act. But as the method of cure is the great object; this in phlogistic inflammations is very simple, every means must be used to lessen the morbid irritation; and in the first place as the blood vessels are commonly full, and their actions increased, it is generally necessary to take blood, and to repeat it once or twice occasionally, according to the urgency of the symptoms; and at the same time, the contents of the first passages are to be evacuated, by gentle laxatives, such as Glaubers, or Rochell salts, or any other neutral salts, or castor oil, and in some cases where a foulness of the stomach is present, emetics or nauseating doses of antimonials are very useful in the beginning.

Irritation, we may consider as the cause of inflammation in energetic habits; but the nature of the inflammation varies with the constitution of the patient, and the part of the body affected; in weakly nervous persons it will partake of the erythematic, or erysipelatous, disposition: and in others it will be of a rheumatic nature.—A. G. Richter endeavoured to drive all diseases from irritation, even the jaundice and dropsy; consequently they must be owing to irritability. Many diseases we believe are caused in this manner; but we would rather suppose that all others were caused by it, than the dropsy, or palsy. Fevers and nervous affections, obviously originate from irritation: and sympathies, which are only secondary irritations, are propagated in some manner not yet well ascertained, from the same source.

Inflammation also takes place from other causes, as in some cases, from excessive cold, which approaches near to that causing mortification. Here, after the numbness is overcome, there is commonly a pain, and prurieny of the part, and generally a slight inflammation, which as soon as it opens, by the skin being corroded, or mortified over the part, has got the name of kibes, a disease not uncommon in grown persons, in cold weather, but more common to boys, on the extremities, as the heels, the fingers, and toes, &c. Covering the parts with a piece of flannel, moistened with oil of turpentine, answers well, before they break; but when open a piece of a bladder moistened with the oil, and the fore washed with it, answers well here.

But in the erythematic and erysipelatous state of inflammation, there is a weakness, or over great mobility of the parts affected; this is the situation in which strengtheners are proper, and cordial nourishment with opiates, and in some instances calomel, as a stimulant, has been useful; for these medicines by giving a firmness to the moving parts, diminish the erythematic state; and here the success of cordial and strengtheners, has given origin to the preposterous practice, of using calomel and bark, wine and opium, in real phlogistic inflammation, both when placed externally, and when seated in the viscera. For superficial observers, and routine practitioners, commonly mistaking the one, for the other alternately, apply indiscriminately, the proper treatment which would succeed in the one, to the other; of this mistake we have repeatedly witnessed the fatal effects, the instances of which are by no means rare; and such practitioners are consequently, both themselves and their patients egregiously deceived: otherwise, how could we expect that any person, bearing the name of a rational practitioner, if he is really in a state to use his senses, and his reason, should expect to cure an erythematic inflammation, in a person of seventy or eighty years of age, by blood-letting, and a debilitating regimen; but the absurdity of this mode, can be only equalled by the treatment of such practitioners in the phlogistic state,



in the young, strong, and plethoric, using stimulants and strengtheners, and not taking blood, &c.

As for external applications to the parts, fomentations, with clothes rung out of warm decoctions, of any emollient herbs, or warm water, are very useful, and the steam both; or even the application of warm bathing, which however should never exceed blood heat, or  $96^{\circ}$ , and poultices, are very necessary; these may be made of oatmeal, linseed, or corn-meal, or pounded biscuit well boiled in water, with the addition of a little oil, or lard, in order to preserve the softness, applied to the part moderately warm, and renewed once, or twice in twenty-four hours, using the fomentations at each application, with an easy posture; thin diluent drinks, and a mild food, mostly of vegetables, avoiding all spirituous drink, or stimulant food, as salt meat, or spices.

Nitre given in as large doses, as the stomach will bear it, so as to lessen the vascular action, is often useful in active inflammations, and antimonials every night at going to rest, promotes a perspiration, lessens the action, and has a tendency to keep the bowels open, which should, all through the cure, be attended to. But as it is in many cases, necessary to be more guarded, against encouraging the formation of matter, and where there is a probability of repelling the inflammation at once, especially when a glandular part is the seat of the disease: instead of softening poultices, repellents must be used, such as vinegar, lead water, &c. and cold applications to the affected parts; for this purpose, bitter and astringent applications are often used in fomentations, such as camomile flowers, and bay leaves, with the addition of a little vinegar, or a decoction of oak bark, in which a piece of allum is dissolved in it; but if inflammations of this nature, cannot be repelled in the course of a few days, they should be treated with emollient fomentations, and poultices, such as before mentioned, rather than harass the patient with unnecessary applications, and a continuance of the pain, in cases of old and obstinate sores, particularly on the legs, we have repeatedly found eminent advantage, from the application of emollient poultices, and fomentations, after they had for



years resisted the powers of both external, and internal applications.

It often happens in inflammations of the eyes, that cooling sedatives and repellents, without the evacuations, such as a rag wet with lead water, a weak solution of white vitriol, or sugar of lead, may be used; and inflammations in the glands should always be repelled, they are so very obstinate, and difficult to heal; unless we except those which are the consequence of the crisis of fevers; for they often carry off the fever by sympathy, not alone by the evacuation of the matter formed.

The erysipelas requires a very different treatment from phlegmon; here evacuations are of much less efficacy, and often hurtful, especially when so persisted in, as to cause weakness, or to increase the erythema (or irritable disposition) such as blood-letting; but gentle laxatives may be used, and every other means which lessens irritation; and at the same time, the vital energy must be supported, in a due tone; on this account, strengtheners, cordials, and the like, are often proper, as wine, and even opium; but particularly, whatever promotes the permanent energy of the constitution; and either removes the irritation, or strengthens the constitution against its effects, such as gentle sedatives, and the bark, after the causes of irritation are removed.

Antimonials are peculiarly useful in this affection, in such quantities as to keep up a perspiration; for at the same time that it relaxes, and empties the vessels on the surface of the body, it promotes a laxity of the intestines; the London antimonial powder, answers here very well, or antimonial wine; they may be given in (ammon. acet.) vinegar, saturated with the salt, or spirit of hartshorn, together with the application of strong spirits, to the part, if the erysipelas is only slight, or ointment of elder, which is an old application to those affections: or the spermaceti ointment; or even oil formerly so universally condemned in this disease, may be applied on soft linen, to the part, as it is a powerful means of allaying irritation, when it is great: but when the inflammatory stage is over, oil will not answer; for then stimulants, &c. are requisite, in order

to prevent a mortification of the parts. It is in this stage that oils, and fats are peculiarly hurtful; for like other causes of irritation, it must cease through time, and leave the parts in a state of weakness.

Inflammations being of such an extensive nature in the practice of medicine: whether seated externally, or internally, that we cannot understand, even the simplest diseases, without an accurate acquaintance with them, in all their different states and varieties.

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### *Burns and Scalds.*

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WHERE the skin is not removed, may, in the first place, be plunged into cold water, as it is often the most convenient application at that instant; but as soon as lead water can be procured, or when it is not at hand, vinegar and water, should be applied on linen rags, folded up, and kept wet with it continually, in order to prevent blistering as far as possible; or sometimes strong spirits, as brandy, rum, &c. answers very well. This course may be continued for two or three days, sometimes changing these applications alternately; observing if blisters should arise, not to open them: for by this means we avoid much unnecessary pain, but let them alone until they either break spontaneously, which they commonly do, if large; or when small, they will disappear, their fluid being absorbed by the proper vessels, &c. and in both large and small blisters, a new scarfskin forms underneath, in a few days, which defends the nerves of the skin from the irritation of the air, or other stimuli.

But in large and deep burns, or even in superficial ones, where the blisters rise, and break suddenly, the irritation and pain is generally very great; in this situation

we have experienced the salutary effects of oil, (olive) applied to the surface on very soft linen rags, doubled and dipped in the oil, and applied to the parts. And the more deep burns, when the eschar is cast off, may be covered with dry lint, and the oil dropped on it, so as to moisten it; and then it may be covered with spermaceti ointment, or cerate, spread on linen, or tow, &c. and in case of great pain, it may be necessary to use laudanum at night.



*Dislocations and Fractures of the Bones.*



**D**ISLOCATIONS and fractures of the bones frequently occur when medical aid may be far distant, and it is often impracticable to be found in a convenient time;—therefore in some country situations, fractures are treated by mechanics, who commonly pretend that they are in possession of some specific applications for their cures, and attain the names of bone setters; when the whole of their knowledge commonly consists in a rude manner of extension, and endeavouring to retain them in their proper directions, in their own methods, but seldom in the best manner. Overstretching, or bending a joint rudely, either tears, or distorts the ligaments, and membranes, and commonly causes acute pain; in this case the immediate application of anodyne liniment, or if it is not at hand, equal parts of laudanum, and water will give almost immediate relief, applied on a linen rag; vinegar, or lead water, are also useful applications at first, either by themselves, or mixed with laudanum, in order to prevent inflammation; but after some time, when the inflammation is gone, then soap liniment answers better; it should be well rubbed on the part. Frictions with penetrating oils have also been useful, such as goose-grease,

and bears oil, &c. are famous among the country people in these cases.

Dislocations, or bones getting out of joint, are remedied by a cautious extention, and afterwards retaining them in their situations by bandages, and by folded pieces of old linen, called compresses, moistened with vinegar, or lead water, in order to obviate inflammation.

The application of bandages can scarcely be described, unless by figures, or upon the human subject, or machines; but as most men have seen them, in one case, or other, and their applications being easily learned, we shall say but little concerning them, only that they must neither be over tight, nor over loose; as in the one case they would compress over much; and in the other, they would be of no use to the parts.

In the replacing of dislocated limbs, the principal object to be attended to, is the mode in which the extention is made; for the success of the operation depends more on this, than the force with which it may be applied. Therefore, gradually extending from one side, to the other, and gently moving it, upwards and downwards, is more likely to succeed, than strong extention in a right line; the force should be begun very gradually, and increased slowly at each trial, in case it resists the first. In case of a luxation being obstinate to reduce, bleeding, from a large orifice, so as to cause faintness, may often be used advantageously; and whilst the patient is in a weak state, there is a greater probability of success, from extention well directed; the operator at the same time, endeavouring with his hands, to replace the dislocated end of the bone.

In strong young men, dislocations are apt to be most difficult of reduction, and in them bleeding is most necessary: but in women, or children, or men of weakly constitutions, they are commonly easily reduced.

Where inflammation has taken place, before the reduction is accomplished, it cannot be performed until that is overcome; for this purpose, cooling laxatives, such as salts, are necessary, together with blood letting, and keeping the patient warm, using warm drinks at the same



time, and antimonial wine, about twenty drops at each dose, in order to promote a perspiration; or a solution of tartar emetic, from a half, to a whole grain—this is very necessary in all inflammations; a scruple or two of nitre is also useful in these cases.

Fractures, or broken bones, are in general easily discovered, by the protuberance of the parts over the injury; and commonly a crookedness of the limb, especially if it is in the upper bone of the arm, or in the thigh bone. The patient can also feel a grating, when the limb, or part affected is moved; the same sensation can also be easily perceived by others, when they endeavour to extend, or place the parts in their natural position.

Fractures are usually attended with considerable pain, and inflammation, caused by the rough ends of the bone, rubbing against the surrounding parts. In order to obviate this, vinegar, or lead water, are commonly used; linen clothes, moistened with these, are generally laid on over the seat of the injury, and kept constantly wet, for the first three or four days. In young, and strong persons, bleeding may be necessary, and cooling sedatives; such as common salts, may be taken inwardly; and the part must be kept in the easiest posture, in which it can be placed and retained straight. We have not yet mentioned extension, and setting the broken bone in its natural position, although this is the first thing which should be done, if possible, before the inflammation rises high; or otherwise it cannot be done until this abates.

A tolerable accurate knowledge of the bones, and muscles, and of their modes of acting, is very necessary here; the muscles of the part should be put in the most relaxed position, and the extension should be made only on the broken bone; so that if the upper bone of the arm is broken, the extension must be made between the elbow joint, and that of the shoulder; the lower part of the arm being bent at the same time: and a similar mode must be used in any other bone of the limbs; the extension must be confined between the ends of the broken bone, that it may prove effectual, and the other parts of the limb may be placed in a relaxed posture.

The application of splints, we believe might be very safely deferred, until the inflammation is over: for even when they are applied before it has arisen to any considerable height, we have generally found it best to remove them, when the inflammation has taken place, if it is considerable; for then the parts are sufficiently stiff without them: and they contribute to keep up an irritation by their hardness, and pressure.

As a very convenient application, in the place of splints, and such rigidly inflexible, and uneasy applications, we shall mention what we have sometimes found a very useful substitute, either to form cases for a fractured limb, or to answer the purpose of splints. The untanned hides which are commonly carried on board of ships, when wet are extremely pliable, and into whatever form they are put then, they retain it when dry. A convenient shape may be given to a piece of this substance, and applied to a fractured limb; and when it gets dry in that position, it will retain exactly the same form which was given it when moist; for as the wet substance cannot hurt the limb, as we generally keep them wet constantly at first, with vinegar, or lead water, on purpose to repress inflammation. The use of paste-board in these cases, is an old practice, and probably was a reason for our having recourse to this species of application, when there were none of that at hand; but now we are convinced that it often answers better than any other application, especially when it is wished that the application should accommodate itself to any unevenness in the surface; which a piece of a raw hide does in the most effectual manner; and becomes sufficiently stiff, when dry.

*Diseases of the Skin,*

**D**ISEASES of the skin are as various as those of other parts of the body. Those which it has in common with other parts, such as inflammations, we shall not take notice of here; but of such as are peculiar to it alone. A troublesome little affection, called prickly heat, is very common to all northern constitutions when they go to warm countries. Of this we have experienced two varieties: the first appears to be the immediate effect of heat, and appears in the form of pimples, all over the body, causing an itching, and pruriency, but particularly in the limbs; we have found common salts, taken once a week, one of the best remedies to allay this sensation, and the external application of diluted acid of vitriol, frequently rubbed on the parts.

The second variety of the disease is more frequent with those who have been somewhat exhausted with warm climates, and brought low by intermittents or other diseases, and possessing acute sensibility, particularly of the skin, in which the perspiration has been very profuse. In such the scarfskin appears to be almost obliterated, and so thin, as not to defend the nerves of the skin from external impressions. In this affection frequently changing the linen is necessary, and dusting the skin with hair powder, or any other dry powder; with doses of salts at convenient intervals, and abstinence from spirituous liquors.

Diseases of the skin which go under the names of herpes, tetters, ringworms, &c. appear to be very similar in their natures, and the same treatment is equally applicable to them all. The scarfskin is the part principally affected; but the true skin and mucous netlike substance, are also in a state of irritation, whereby the secretion is in-

creased, and a prickling sensation, is produced with a scaling appearance of the scarfskin.

These affections are probably a milder variety of the leprosy of the east ; when on the west coast of Sumatra, we often observed affections, apparently of the same genus, amongst the Malays, but of a far more inveterate nature ; for in many of them it formed large warty like protuberances ; between which there were commonly large fissures, which penetrated through the skin ; these appearances were more common there, than we remember to have seen them in any other places. This disease may be attributed to their modes of living, as they are a people but little advanced in civilization : and are not the most cleanly in their dress, or modes of life. Salt pork, ham, or fish appears to predispose to this affection, for we have seen it very prevalent among those, who live much on such food ; and this is supposed to be one reason why swines flesh was forbidden to the Jews ; for among them this would appear to have been a formidable disease. It is also not uncommon amongst those who go to the East-Indies from northern countries, more especially amongst the young ; but whether they acquire it by contact with the natives, or by the modes of living on board of ships, we are not certain. However in those whom we have had under our care, it was seldom very difficult to cure, when treated in a proper manner ; and especially in those who pay proper attention to cleanliness, which those we were among commonly did.

In the treatment of these appearances, some purgatives should begin the cure ; a dose or two of jalop, and calomel, or some other such stimulant, may be given ; and afterwards common salts, once a week ; and for external application, we have found nothing answers better than a mercurial lotion, or where it fails, as it sometimes does, lunar caustic rubbed on the parts, and on the sound skin, over which they are making their way, near to them, by thus destroying the poison, or the disposition to it ; but that over which they have passed, need not be touched, as it has lost all susceptibility, of being affected ; this method when duly persisted in, seldom fails. But where a large



surface is diseased, a lotion generally answers best.— In some cases, there are large, reddish, and scaly spots, appear on the skin; they are commonly itchy, and often said to be derived from a surfeit; for these a fluid commonly answers best; corrosive sublimate, one grain or two to the ounce of water, with as much sal ammoniac, answers well for these; with which the parts may be rubbed over in the mornings, as the skin is then commonly the most soft; the application, consequently then produces the best effect.

In those who live much on salt meat, as it is common, both in the country, and on board of vessels; especially in young people, who are at the same time negligent of cleanliness; large blotches on the skin are very common, as well as the preceding affections; they appear with eruptions, which scab over; those persons of gross, and torpid temperament, are most subject to these affection. But with respect to the most eligible plan of cure, a dose of one scruple of jalop, with two grains of calomel at the beginning, commonly answers very well, once or twice a week. Also, rubbing a little strong mercurial ointment every morning on the parts commonly removes them. Abstinence from salt meat if practicable, and also from spirituous liquors is necessary, and after two or three repetitions of the purgative, it may be changed for salts, which commonly completes the cure; for all these appearances on the skin, we would advise a regular use of warm drink; decoction of the woods have been famed here. Also tea used regularly, or any herb teas, which ever the patient may be fondest of, sweetened with sugar; which, together with the warm water, we believe to be the most necessary part of the regimen, so that any herb or wood, which has an agreeable flavour, as saffraas, may be useful. Guaiacum has virtues peculiar to itself, in these and other affections.

Common boils, are frequent in some young persons, of gross constitutions; they are rather diseases of the membranes under the skin, in their origin, although the skin itself is generally affected in their progress. They are very nearly allied to blotches, as the smaller inflammati-



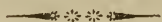
ons of this nature are named : and require a treatment, in many respect similar ; only that boils, when suppuration is advancing requires poulticeing, in order to ease the pain, and to promote the suppuration ; poultices of oat-meal, or of Indian meal, well boiled in water, and applied with a little oil, or lard, answers very well. By this means they suppurate without causing much pain ; and when matter is formed, it will either make its way through the skin, or it may be let out with a lancet : and then dressed as an ulcer. In order to eradicate them from the constitution, in those who are often troubled with them ; two or three calomel purgatives may be necessary—one or two grains of calomel, with a scruple of rhubarb or jalop, generally answers for this purpose : and afterwards, one, or two doses of salts, in order to allay any irritation which may remain, in consequence of those drastic purgatives, and to soothe the irritable habits of those, who are affected in this manner.

The itch also is one of the most disagreeable diseases of the skin, it is most common among those who are negligent in cleanliness. It is in general so well known as not to require a description ; some northern parts of the world have become famous for it. It is most common in cold weather, especially among those who live in damp habitations, such as the ground floors of houses, or in cellars, especially if they are inattentive to cleanliness, and live much on gross food : such as salt pork, ham, or smoke-dried fish. Some purgatives of salts may be of use here, in order to set the habit of body in order ; and repeated once, or twice a week, during the cure. For external application, sulphur may be rubbed on the parts, the dry flour of sulphur answers as well as the ointment, without the inconvenience of the smell, which require perfumes to make it tolerable ; as mixtures of it with lard do.—The acid, or oil of vitriol, diluted with water sufficiently, for the skin to bear it without pain, is an old practice in the British navy, it is both a cleanly, and efficacious application for this affection.—The itch is known by its affecting the hams, and between the fingers, and the

wrists, with small itchy pimples, and causing a scurf on the skin.

In some cases cutaneous affections are so obstinate as to resist the strongest solutions of corrosive sublimate; when this is the case, lunar caustic commonly succeeds; this last is so powerful in these cases, when used every two or three days, and persisted in for some time, that we can scarcely recollect an instance of its failing. In some cases, defending the parts from the air, may be necessary, especially where they penetrate deep, and have corroded the skin; as a defence for these diachylon with gum, spread on linen, answers better than almost any other plaister, as it is of a very adhesive nature, and is so mild as not to cause any great irritation.

Where there are much irritation of the skin, after mercurial laxatives, and the eruptions appear to be rather made worse by them; or do not disappear by their use, after two or three doses at three or four days interval; then salts should be used—for the irritation caused by the mercurials are commonly best allayed in this manner, by the sedative properties of the (neutral) salts.



### *General Observations.*



IT has been much disputed, whether the practice of medicine, is carried on to more advantage, and improvement to the profession, by being divided into surgery, physic, and pharmacy, as it is at present in some parts of Europe; or whether it would not be more for the interest of the public in general, as well as for the faculty, if all the branches were united in the same person. It is advanced against this last mode, that the science of medicine

is too extensive, for human life; and the common limits of the mind, are too contracted to allow the generality of men sufficient time and opportunities, of arriving at any tolerable degree of perfection, in all the different branches. This however, is only partially true; and where it might appear to be most so, it is little more than specious deception; for although the studies are many, laborious, and extensive, yet every one of the sciences which have any tendency to explain the animal œconomy, either in a state of health, or disease; or the preparation, choice, and operations of medicines upon it: that the man who is not capable both of acquiring, and comprehending all these necessary qualifications, must necessarily appear to any person of common capacity, a very improper agent to administer relief, in any dangerous case. Besides these different sciences are so connected together, that there is no such thing as to be a complete master of one of them, and to be ignorant of others; for there are no such thing as learning the practice of the healing art, by halves. One must either understand all, or be incompetent in all: therefore, with a few exceptions, from local circumstances, a general practice, as well as a general knowledge of the animal œconomy, and of diseases, will be most for the honour of the profession, and for the advantage of mankind in general. Some men nevertheless, from particular circumstances, as from having more practice in surgery, or from having been more expert practical anatomists, may excel as surgical operators; but this should not exclude them from a general study, as well as a general practice; and the more eminent they are in all the departments of the healing art, the better we may expect they will be in their own favourite branch: as one part of the animal œconomy, either in health, or disease, does always elucidate another. A knowledge of anatomy, and the mode of performing operations, is sure enough all that an operator might require; but there are few surgeons who confine themselves merely to operations. Either London, or Paris, would support but a small number of this description. Therefore as they practice medicine, they should certainly study it, and learn

the practice under the masters of the profession : or at least the animal œconomy, and the operation of medicines on it.

With respect to the preparation of chymical medicines, they may undoubtedly be done to most advantage in the large way ; and that they may be prepared with the more œconomy, they require much attention : but one person, who is well versed in this business, may save several hundreds the trouble, by supplying them with the more complex preparations ; but every practitioner should understand the principles of these preparations, and be qualified in case of necessity, to supply himself ; for every one should know their component parts, and be able, either to compound, or decompose them. Therefore, they should be well acquainted with chymistry and pharmacy, before they are fit to make the best use of the medicines, or indeed before they should be allowed to make any use at all of them ; for without this knowledge they are liable, every time they prescribe, to commit some capital mistake ; either by converting mild medicines into corrosive poisons, or rendering them quite useless. And although they may avoid these errors, by following a routine, which some persons of the necessary information have laid down to their hands ; yet in either case, they are but little better than machines, without the qualification before mentioned.

The apothecaries company in London, have been of much advantage to the country, by supplying it with genuine medicines, in comparison of the situation, in which France, and other countries were in, where medicines were prepared and sold by unprincipled persons, at fairs. Enough of their abuses are related in the regulations produced by the medical faculty of Paris, in the year 1789.

The preparation of medicines, especially in large towns, may very well afford employment, for those who deal in that way ; and if they go through a regular education, and have time and opportunity from their other avocations, there is no good reason why they should not also practice.



But the greatest acquaintance with the collection, choice, and preparation of medicines, never will learn any person their effects on the human body. This is a distinct and separate subject; therefore we might with as much justice suppose surgeon's-instrument makers, qualified to perform surgical operations, as to suppose that every one who deals in medicines, knows their effects on the human body. But if any person did not foresee the impropriety of this, experience would soon teach them; but the operations of the internal instruments of medicine, are not so obvious to the senses; therefore, though their preparers may be quite as ignorant of their operation, they are not so liable to be detected, and therefore are often able to pass for what they have no claim to. But as to the other branches of the healing art, we can confidently maintain, that they should not have any artificial barriers between them; for if there are, they are sources of many inconveniencies, and of scarce any advantage, either to the profession or the public; unless to suit the indolent, who will not exert themselves, to acquire the requisite information, for the practice of the art they profess.

It may suit the taste of some very delicate gentlemen, who are afraid of using instruments, because in reality, they might at once make a fatal display of their ignorance of anatomy, by wounding some important part, of whose situation they were not sufficiently aware. It may be supposed by some persons, that by practicing physic only, they may pay the more attention to the symptoms of internal diseases, and their cures. But it would be very easy to prove this mode of reasoning to be very superficial, and that unless they are first made well acquainted with the external, and visible diseases, and the methods of treating them to the greatest advantage; they have but a small chance of making any tolerable progress in the knowledge, or treatment of those which are internal, and concealed. Upon this subject we would recommend a careful perusal of Kirkland's Medical Surgery; in the introduction, as well as all through the work, there is much original and useful information to be found, on this interesting subject.

The theory of surgery is generally allowed to be a necessary part of a medical education. But theory in such an intricate art, without practice, or experience, is little better than a useless load on the memory, and can scarce ever answer any useful purpose; but often does much hurt, by making the possessors of it presuming, and self-sufficient. In like manner, the theory of pharmacy, without the practice, is difficult to acquire, and almost useless when acquired.

Therefore, we believe the best mode of education, is first to enter upon the study and practice of pharmacy.—The names of a Hunter, and a Fothergill, are greatly in favour of this plan. Next add anatomy, and surgery, and as nothing can be in the intellect, which is not received through the senses; the theory and practice, will mutually elucidate each other; and if there are any excuses for leaving off the practice of surgery, they should be only those of old age, an unsteady hand, or loss of sight, or from a multiplicity of business; but to do it for fear of the smell of sores, or the horror of operations, argues too great delicacy for any man, who would live by the practice of medicine: for it would be much more advantageous to pass some time every day in this employment, than poring over books, although they have their advantages.

As it may come in course frequently to mention medical science, a consideration of it may not be improper here, especially as it is sometimes confounded with ideal hypothesis; a base counterfeit, which is very frequently imposed on the world, as a substitute for theory; but as this has been the case ever since medicine was practised as a profession: theory has often been disgraced by sophistry and speculation.

When we see real facts, and their consequences, happening under the observation of our senses, and we think and reason concerning the manner in which they are brought about: this is theorizing. But science is the result of experience and observation, carefully made, and attended to, either by ourselves, or others, on whose candour and abilities we can depend; and the operation of

our reason on these facts, which we either perceive by our own senses, or believe on the report of others; this is drawing conclusions from facts, and reasoning from these without admitting any thing into the fabric, until carefully examined, and approved by the test of experience. Hypothesis on the other hand, may be totally built up without any real observations; it is a creature of the mind, or speculation, very similar to Berkley's world of ideas; and it is only to the inhabitants of such a world that it can be of any use. People of volatile and flighty dispositions, whose judgments are commonly very weak, by a defect in their early educations, of inculcating accuracy of reasoning, are peculiarly liable to fall into hypothetical, and sophistical ways of reasoning, through want of solidity of thought, to apply their reason in a right train. Such people have at all times been very apt to fall into hypothesis in medicine, and amuse themselves, and their disciples with forming structures in the ærial regions of imagination; which although as illusive as fairy tales, have sometimes passed for profound erudition, or great thoughts and discoveries, among their more ignorant acquaintances; but which in reality, nothing but actual experience can shew the vanity of, with any degree of conviction, so that between these two the difference is full as great, as between the two men, mentioned in scripture—the one of whom built his house on a rock; whilst the other was content with a foundation of sand.

The common performances of this species, are generally a mixture of theory, and speculation, deduced from a few imperfect observations, perverted and turned to answer some pre-conceived hypothesis, the deficiencies of which are often filled up with superficial arguments, that they may appear the more plausible. But although we are persuaded a genuine theory of diseases would be of great utility, yet the fabrications with which we are often amused, tends more to retard than to advance the perfection of the profession, by their authors setting them forth as infallible; when at the same time they have stood on very slender foundations.

When chymistry, after being long persecuted by the regular Galenists, and Dogmatists, was at length admitted into the Temple of Esculapius, physicians thought they might account for every function of the human body, and all its diseases, chymically; hence, acids, and alcalies, were thought to cause many diseases, few indeed, in which they were not thought to have some share. And in a still later period, when mathematics, and mechanics, came to be fashionable, and liberal studies; particularly after Newton's famous demonstrations—others attempted to account for the most intricate diseases, mechanically, and mathematically; but although these are very necessary, and proper studies, and what no gentleman or physician should be without; yet we know that it is possible to misapply them; for although the sciences are the great assistants, and strengtheners of our reason, yet the properties of animated bodies form a science, very different from all others, and should therefore be studied by itself, and upon its own principles, and not on those of chymistry, or mechanics: neither of which can explain animal, or even vegetable life.

The actual practice of surgery is the only means by which the internal diseases of the body can become the objects of our senses, by having seen similar appearances when on the surface, and comparing them with the pulse, the countenance, the tongue, and the eyes: for being used to examine these appearances, which are within the reach of our senses, we shall certainly be much fitter to judge of diseases, when concealed from our sight. But it has been always allowed, that every physician should understand the theory of surgery; but it would not require much argument to demonstrate that theory, without practice, in this pursuit, is little more than an useless load on the memory, and an incitement to pedantry and presumption, and frequently leads the possessors of it into the wilds of hypothesis, and exposes them to the contempt and ridicule of the more rational, and intelligent part of mankind: for theory without practice, leads to speculation; and often raises vain men in their imaginations, far above the clouds, into the regions of wild fancy, and



boundless conjecture ; and by propagating their unfounded ideas, for real facts, have led away the unthinking, by a superficial cover of sophistry. But those who take the liberty of thinking for themselves, and are qualified for it by observing rationally, will not be led away by such specious, and ill-founded doctrines.

Theory in medicine, like theory in any other art or science, should be deduced from experience, or otherwise it is mere hypothesis, and conjecture, which is very often prejudicial, in leading the inexperienced astray. But real science must be the result of experiments, carefully made, and diligently attended to, by persons capable of judging for themselves, and of distinguishing the causes of the phenomena, and marking them, as they occur, and separating those which are accidental, from such as are constant and invariable. But theories when they are adopted, must always be subject to correction from facts ; and under these restrictions they should always be inculcated, lest they lead away the inexperienced, which are very numerous in every community : for mankind are constantly led away, and prepossessed by prejudices imbibed in their youths, which requires greater strength of mind, experience and fortitude to overcome, than most men are masters of ; but to those who possess minds capable of progressive improvement, and reason for themselves from real facts ; these may be surmounted. We should not here be understood as depreciating all theory, but rather as appreciating its real advantages in medicine ; for while we think on facts, we theorise, and indeed we cannot well think, or reason without it : besides it is of the greatest use in giving beginners an idea of the outlines of the profession ; but cannot with any degree of propriety be used as a directory for practice ; any farther than repeated experience warrants, and here science takes place. It may be said that theory is drawn from this very source ; nevertheless it never can give laws to nature, and we hope it will not be maintained, that any being, less than the Deity, was ever capable of forming a complete theory of medicine.

The regulations formed for the university of Dublin, in the year 1785, and those of the Royal Medical Society in Paris, in 1789, which may be seen in the 17th. volume of Duncan's medical commentaries, are very much to the purpose; they prefer public utility to antiquated forms, which are common in most seminaries. But a very numerous class of mankind are unable to distinguish prejudice, from principle. They cannot take on themselves the labour of thinking, or reasoning on any subject; but prefer going on in the old routine, in which their fathers, and themselves have been bred, without adopting, what to them would appear pernicious innovations. In this manner have the polite natives of Hindostan, and China, gone on for many ages, without making any discoveries of importance, either in the sciences, or arts; for in those luxurious and warm countries, the minds of the natives recoil at the idea of thinking for themselves on any subject; even the lash of tyranny cannot rouse them from this torpor.

The new medical regulations of Paris pay due respect to practice, without neglecting the other preliminary, and auxiliary sciences; but these in this plan, are little more than an amusement: whilst the practice is the serious employment of their times, and upon which their merit must rest. And it would very much contribute to the honour of the profession, if other seminaries of medicine, would adopt many of their improvements, both with respect to the professorships, which are to be filled by men of merit solely; which is to be determined by competent judges; who in their examinations are to be on their oaths, to do justice to the candidates. By this means, men of the greatest eminence, are sure of being chosen to those important offices; and thus the respectability, and utility of these appointments, and of the professors themselves are preserved, and the worthless excluded. But when given by patronages, the professorship may be degraded, and the professors become contemptible. This must appear evident to any discerning and candid mind.

Uniting the practice of physic and surgery, is a very important improvement, as the internal diseases cannot

be so well known, by any other means, as they are by the constant practice of attending to the external diseases, in the practice of surgery; for by this means we can with the greatest certainty determine, by the feel of the pulse, whether there are any internal inflammation: by the accuracy of touch, which the practice of surgery is the only effectual means of communicating, &c. and likewise to distinguish the irritable, low, and erythematic disposition, from the inflammatory. Likewise our sight, smell, and other senses, acquire an exquisite nicety of distinction, through use, which is never to be obtained otherwise, than by actual practice. In these regulations the examinations of students, are something more than a formal parade, by independent practitioners, on actual practice, and are very strict; no dependance is put in dissertations, &c. being well aware of the means by which they are generally composed; but they do not discourage them.

It would have been a very happy circumstance in the practice of medicine, and very conducive to render it more scientific in the present times, had there been more attention paid to the symptoms of diseases, and less to their names: for then the physical causes of the symptoms would have been more attended to. Indeed it would even have been better, had names never been applied to diseases, than that the symptoms should have been neglected: because it is from considering all the phenomena, that we can find the nature of the disease—and even with all our attention, it is sometimes a matter of difficulty to find out their natures at first. But we must have recourse to the causes, whether external or internal, as the preceding weather, the prevalent diseases, infections, the age, sex, and temperament of the patient. And since it must be by the symptoms, that we are to find out the disease, when considered together, with the other appearances; it is likewise by them that we are to be directed in our methods of cure. But it is impossible to proceed rationally, unless we consider their cause and modes of acting. But it often happens, that a name for the disease, is the only thing paid any attention to, by a certain class of practitioners: and that must, without other informa-

tion, be very often misapplied ; through a neglect of paying proper attention to the causes of the symptoms ; and in these circumstances, this has been a great source of an empirical practice : because when any ignorant person gets a name for a disease, and a prescription, which had before succeeded in a disease to which the same name had been applied, either from his own experience, or often from vague report ; he will undoubtedly consider himself qualified to act the physician, although he may be totally ignorant, both of the animal economy and the operation of that or any other medicine when applied to it. But although no laws can ever hinder any man from disposing of his own life, or health, as he pleases ; yet for the sake of humanity, as well as policy, there should be laws to prevent the ignorant from tampering with the lives, and healths of others, and from making a livelihood by such modes of practice. It is to the symptoms, habit of body, and other appearances, that attention should be paid, and also to the stages of the diseases ; from these alone, the only safe indications of cure are to be taken : but the names of diseases, are often merely arbitrary, if defined, and worse applied. Attention, however, is to be paid to the antecedent, as well as the present symptoms ; or otherwise should we visit a person in the hot stage of a remittent, or intermittent fever, we might mistake the disease for being highly inflammatory, and treat it accordingly.

But whilst much attention has been paid to the names of diseases, their constituent parts have been too much neglected ; hence the reason why names have often been improperly applied, and diseases uncertainly defined, and classed unnaturally ; for if ever any good can be done by nosology, it must be by classing diseases in a natural order, as far as they will admit of it, and this must be done at the bed-side, and not in closets from books.

Those whose spheres of practice have been much confined, would have all diseases, of whatever variety, which have gone under the same names, however different in their appearances and symptoms to agree in all respects, with regard to the treatment, with such as they may have happened to see ; whereas a greater variety of experience,



would have taught them otherwise, if they would only employ their senses, and their reason, in diligent observations on the phenomena of diseases, their natures, and cures; but particularly the animal œconomy, and the operation of morbid causes upon it, and the means by which they bring about their effects, requisites apparently too much neglected by many practitioners.

One great cause of these abuses is very obviously to be traced to the imperfect modes hitherto too often practised, in the education of medical gentlemen; for whilst teachers are the examiners, it too much resembles a father's recommending of his son: and in this manner, they send physicians into the world, without ever initiating them into the practical parts of a medical education; such as is commonly given at those nominal seminaries, where they make a pretence of teaching medicine, without hospitals, or dissections, or any other part of the practice of medicine. In such places, young men may learn to talk, and read of diseases: but they never will learn to cure them there. These institutions take their origins from the times of Gothic ignorance, when all literature and science was confined to the clergy; for then the Pope only could found universities; and bishops could make physicians, which they did as commonly, and with as much ease as they could confer holy orders. The bishop of London, was the person then to be applied to for a licence to practice medicine in the city; and even to this day the bishop of Canterbury has the privilege of making physicians.—Although since the establishment of the college of physicians, he only makes one during his incumbency; it is fortunate that such an easy introduction is not more common.

Paying too much attention to systems of medicine, is another great source of error, especially as they are so generally compilations, and more frequently the products of fertile imaginations, than of real experience. It is very well for a young man, at his beginning the study of medicine, to learn the doctrines of the most unexceptionable system, in order to gain an idea of the diseases of the human body, on a small scale; the same as in learn-

ing geography, we should first learn the doctrine of the globes, and maps of the world on a small scale, before we can well understand the maps of the different countries, and provinces.

In the study of medicine, we may gain a general idea of diseases, by attending lectures, and reading systems of medicine; but these must give way to practice and compleat treatises, and the observations of well informed practitioners: who have made it their business to use their own senses, in the course of their experience, &c. to improve our knowledge, and treatment, of one particular disease; for this may be within their abilities, or a class of diseases, in which they have had much practice, and have introduced some improvements, either in our knowledge of their nature, or treatment.

Mr. Potts who did so much honour to himself, and to surgery; in his lectures always cautioned against systematic writers gaining too much credit; because all systematics must be compilers in some measure. At the same time he gave some necessary hints with respect to the writings of inexperienced young men, who sometimes hurried away by a volatile genius, are fond of speculations, and worshipping the idols of their own making, and would willingly persuade others to do the same, that they might gain the honour of being the leaders of sects. Although they may be as ill founded, as the baseless fabric of vision! a dream, or creature of the imagination.

There are another sect of intruders on the public, no less hurtful than either of the two foregoing, and no less taxers of science, and good sense. These are the compilers who make a trade of book making, whether they are qualified to write or not; taking to pieces the best works of others; by this means multiplying books, without adding any thing to the common stock of human knowledge, either in medical or philosophical science.—Such performances are only adapted to very superficial inquirers, as they give some imperfect information on many subjects; but of none compleat.



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# BILIOUS AFFECTIONS,

AND

## *DISEASES of the LIVER.*

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IN the summer, and autumn, bilious diseases are so very common amongst every class of people, that they appear to be a subject worthy of some consideration, to enquire into their causes, and the methods of cure best adapted to them. It is a popular opinion, in all warm climates, that the bile is a very frequent, or even a general cause of diseases; without often carrying their investigations any farther into their causes, &c. especially among the natives of colder countries, who have lately moved thither; but as it would not be agreeable to physical accuracy, to give a blind assent to popular opinions, even those of a more refined origin; it is our duty to collect experiments, and observations, and then to confine ourselves to the strictest rules of reasoning.

The nature of the bile itself, as a fluid, has undergone repeated chymical analysis, and its properties, and uses have often been examined, particularly by Baglivi, Mr. Long, and many others of the latter chymists; but we must not stop here, for we should consider its physical pro-



perties, in the human body, both in health and in disease, and this is only to be learnt by experience, in the body itself, and not by any analysis—and we must consider how far it is an active, or only a passive agent, in these respects, and consequently how to alter, or regulate its supposed ravages on the animal frame; or what we may, in the course of our researches, find more near to nature and truth. By this means we may learn how to regulate the causes of the morbid effects of the bile; for if we can here ascend one link farther in the chain of causes and effects, we approach so much the nearer to the source of truth; and are the less liable to fall into error.

The regurgitations, and other aberrations of the bile, are most frequent in the latter end of warm summers, and in the beginning of autumn, after the greatest heats are over; and in warm climates; they occur frequently in those who have lately arrived there from colder climates—but not so frequently among the natives, nor those who have resided some years there, and whose habits of body are accommodated to their situation. This is a process which actually does take place, and opens a field for experimental physics.

It is something remarkable in modern times when we have neglected the fluid pathology, so long after being convinced of the fallacy of these speculations; that we should yet retain the bile, though a fluid, in all its majesty, and make it an agent so universally active, as it is supposed to be, in the production of diseases; on enquiry however, we may possibly find, that here we are only deceived, by sensible appearances, taken inconsiderately from superficial observations. We can find in medical history that the pathology of the fluids is much older than even Hippocrates, the fluids having been assigned their different provinces, and classes of diseases by the older Grecian philosophers, before either the father of medicine, or his preceptor Democrates, wrote or taught; and if we except the supposed heresy, introduced by the methodic sect of physicians, and their adherents, it continued in vogue until about the beginning of the eighteenth century; for the chymical hypothesis, neither proved nor disproved

it ; neither did the archeus of Van Halmont, nor the mechanical theories, in any measure ever oppose it, but so far from it, the doctrine of the moving solids as delivered by Hippocrates was almost forgot, by those speculators on the fluids. Baglivi was one of the first successful opposers of these speculations, as may be seen all through his works, and also, Hoffman, so that at present, unless in the case of the bile, there are very few advocates for a fluid pathology, &c. the causes of this may merit inquiry at present.

The bile is the only fluid of the human body, which differs very much in colour from every other of our fluids, And therefore, whenever it is any where diffused in the skin and eyes, out of its natural course the biliary ducts and intestines, it becomes remarkable, by its very sensible colour ; and according to a popular way of accounting for causes and effects. Whenever any two unusual appearances take place together at any time, the one is generally said to be a consequence of the other, though they may have little or no relation to one another. So that the bile, being very visible, when put out of its proper course, by any obstruction, or irritations, or when secreted in larger quantities than common, by reason of any thing stimulating the liver, or even the entrance of the hepatic duct, into the intestine by being stimulated, or the stomach, or intestines, being either stimulated, or otherwise morbidly affected ; the liver sympathizes by means of the intervention of the biliary ducts ; but many other parts, as the pancreas, salivary glands, skin, and even the kidneys, likewise sympathize with the stomach, &c. so that was the pancreatic juice, or saliva, &c. as visible, when diffused through the system, as the bile, we should have as many pancreatic, salivary, and such like diseases, as now we suppose we have of bilious diseases ; but these other fluids, not appearing so visibly, are totally neglected, whatever evils they may be the causes of.

As to the appearance of the bile, we can only account it a symptom ; the business of the physician is to investigate the causes of the symptoms, their modes of action, and their consequences, &c. and not to stop at external

appearances. But without any further consideration, it would appear absurd to say that the bile, or any other fluid of the human body, is the cause of its own degeneracy, whether in quantity, or in quality : but for the causes of these morbid appearances, we are to examine the secreting glands. With regard to the redundance of the bile, it is known to be a general law of the animal economy, that when any gland, or any of their ducts or membranes are irritated, their secretions are increased ; and this as often happens by the membranes or ducts, &c. of the liver sympathizing with those of other parts, in their vicinity, or with parts of a similar structure, and functions, though seated in distant parts ; therefore, when the membranes of the eye are irritated, the lacrymal gland secretes more tears, when the salivary glands are irritated by pyrethrum, tobacco, or mercury, they secrete more saliva ; and so of the mucous glands of the nose ; and the kidneys being irritated by diureticks, they secrete more urine ; and likewise when the liver, or its membraneous ducts are irritated by any means, directly or indirectly, an increased secretion of bile is the consequence, even although the primary seat of the irritation may be in the duodenum, or even in the stomach ; in which case it takes place by sympathy, or consent : as we may observe is the consequence of the operation of strong emetics, or rancid, oily, or acrid substances, being contained in the stomach, or duodenum ; for the irritation of a gall stone in the biliary ducts, causes both strictures of the ducts, and a larger secretion of bile ; but in these cases, as the bile has not liberty to pass by its natural course, it is absorbed by the minute branches of the vena cava. And the absorbents regurgitates into the system, and this is the common way in which a jaundice is formed ; and the whites of the eyes, the skin, and even the urine becomes deeply tinged with the yellow colour of the bile ; and if any disease can be said to proceed from the bile, this would appear to be the most likely one ; but on consideration again, it is whatever causes the stony concretions, that is the cause of all the other symptoms which occur in the jaundice, and of the disorder itself.

Choleras, diarrheas, and dysenteries, have been often attributed to redundancies of the bile. It is very certain, that an increased secretion of this fluid, may, and generally does, accompany all these varieties of diseases of the intestines, not as their cause, but in consequence of the irritation, which causes the complaints, after the manner we have just described, and as it is treated more at large under the head of the diseases we have mentioned. Any thing obstructing the free descent of the bile, through the intestines, as hardened excrements, spasmodic strictures, or any acrid, irritating, or even sedative matter, perverting their functions, and disturbing the peristaltic motion, will cause a regurgitation of the bile into the stomach, as well as an increased secretion of it. And hence, together with choleras, &c. we hear of bilious cholics, bilious fevers, and a variety of other faults attributed to the bile; whereas in accuracy of language, they appear only in consequence of the original cause of these irritations, so far is it from being the efficient cause itself. It is on this false supposition, of the bile being the immediate cause of these diseases, that we hear of so many popular remedies for ameliorating the bile, especially in summer and autumn, when diseases accompanied with an increased secretion of bile, are most frequent. But any one who will seriously and judiciously consider these matters, must soon be convinced how futile are all such speculations, and the practices founded on them. Here it may be said that we are going in direct opposition to popular opinions, and established prejudices; but as the investigation of truth, and scientific principles of physic, and the healing art, are our objects, it may often be necessary to deviate from the general opinions of mankind; but here we have the happiness of being supported by some of the most eminent physicians of the present century; and also by that which we put more dependance in, our own experience. Popular opinions must be respected; but it is sacrificing with too great a degree of condescension, to follow them into error, in any subject with which our line of life leads us to be conversant; and of course to see farther than the majority of mankind can ever expect to do. But many pro-



fessed practitioners, talk of bilious diseases, and of remedies for the bile, as though it was an animated substance. This we know may, and often does happen, in consequence of their accommodating their language to the common opinions, as they may sometimes mention diseases of the blood, or other fluids; but it may be, that some of them do not know better, through neglect of necessary information.

Bilious fevers are terms so common, that any person ignorant of the economy of the animal body, and of its diseases, would be apt to imagine that the appearance of bile was a characteristic of a separate species of disease; it appears however in a great variety of diseases. But although the appearance of bile, only points out some morbid affection of the first passages, the liver, or biliary ducts, yet it shews itself in many diseases, or even without any other cause, than that of having taken an emetic; although it appears more frequently in some seasons, climates, and situations, ages, sexes, &c. than in others; yet it is not by any means a discriminating, or characteristic mark of any one species, but only a symptom of a variety of diseases; and when it appears early in autumnal remittents, especially in those whose malignity is heightened by infection, it is a very bad symptom, if it appears before the fifth, or seventh day, in the eyes, or the skin. For it denotes a great degree of irritation about the biliary ducts, liver, &c. which most probably arises from their sympathizing with the stomach; and the head-ach, there is no doubt does arise in this manner from the stomach; for there is no part, the skin excepted, which sympathizes so commonly with the stomach, as the head does, in all its affections: hence the head-aches, which so generally accompany a sick stomach.

But we cannot with any propriety accuse the bile of being a cause of diseases—a fluid whose secretion is increased by the irritation of its secreting gland, which irritation is the cause of the phenomena. When the secretion of the saliva, urine, &c. are increased, by their secreting glands being stimulated, we do not say that the saliva, &c. is in a diseased state, but turn our attention to the stimula-

ting cause, whether mercurials, or other stimulants, as the sole cause of all the appearances, &c.

And in the same manner should we consider the secretion of the bile, when it is either deficient or redundant. When the secretion appears to be defective, it is evident that gentle stimuli are required, to the (*prima viæ*) first passages, and the hepatic system, as saponaceous cathartics, and gentle mercurial medicines, in the form of pills; and bitters, as the columbo root, or others of a laxative quality. When there is an increased secretion of bile, it is evident that there is some uncommon stimuli, or irritation in the first passages, with which the liver always sympathizes, or in the liver itself; and in this case, mild sedative purgatives are indicated, as castor oil, sal rochel, or common salts; and by this means, it is evacuated in the most gentle manner, and the irritation allayed: but I would here caution against the common practice of exhibiting emetics in these cases, as they often stimulate over forcibly; and as strong emetics always increase the secretion of bile, which generally appears after the second, or third recurrence of the vomiting, which is the cause of the common opinion, that the bile which is brought up, was in the stomach before the vomiting began, and consequently, that it was the cause of the sickness, when it was only forced there, by the agitation of the viscera, in vomiting. It may be proper also, to guard against the too common use of emetic tartar, it is at best a very unmanageable medicine; but in these cases, and especially in warm climates, or seasons, it is often pernicious; on this account it should only be used in conjunction with ipecacuanha, as ten grains of this root, with one or two of the antimonial tartar, forms a very safe, and generally a useful emetic, when requisite; but unless in torpid habits, emetics are by no means innocent medicaments, as a frequent use of them weakens the digestive powers of the stomach, and cause an apparent necessity for their repetition; and the more frequently they are used, the more do they appear to be demanded; but gentle laxatives, and bitters, obviates all these sensations in a more effectual manner.

In the beginning of fevers, particularly remittents, redundancies of bile are very common; evidently caused by irritation, about the stomach, &c. The bile here, is not the cause of the fever; but appears in consequence of it. By its quantity part of it may get into the stomach, and will, whilst there, probably contribute to increase the sickness, &c. but the safest way of evacuating it, is downwards; by this means the feverish commotion is allayed, in a much better manner than by emetics. In cases of intermittents, emetics are a necessary part of the cure, and are consistent with good practice; but particularly when there is no inflammatory disposition present—but when inflammation prevails, their propriety is more doubtful.

In cases of obstructions in the biliary ducts, by an inflammation, contracting their diameters, accompanied with an inflammatory state of the stomach, &c. as in some remittent fevers, but particularly in the pestilential, or yellow fever, there is generally such a degree of irritation about the stomach, that emetics are inadmissible, unless given before the fever is fairly formed; for then they may be given to advantage in some cases, but otherwise they excite such commotions as cannot be alledged afterwards; for a spontaneous vomiting is a common occurrence in these affections, which sometimes cannot be alledged by any means. When biliary concretions are the cause of the obstruction, as they sometimes are in the jaundice; then emetics may be advantageously used, in order to expel them in a forcible manner, by the concussion of the parts—But this state is best determined by the absence of inflammation; a consideration of some importance in this place, as it is in all diseases where inflammation may happen to shew itself as a symptom; for an inflammation seldom is an original disease, but a concomitant of many, as it very much depends on the patients habit of body, whether it appears or not.

There are varieties of pills advertised, under the character of antibilious, and purgative pills, and commonly supposed to be specifics in these affections; but as the most material parts of their compositions are aloes, calomel,

ganeboge, and other drastic substances—the habitual use of them is generally attended with pernicious consequences ; for it will be found by experience, that when any one has got into a habit of using them, the necessity for repeating them, is thereby increased ; as it is a property of all these drastic cathartics, and of rhubarb also, to leave the habit more costly after their use ; besides that by getting into a habit of using them, it is very difficult to be left off. But the neutral salts, or castor oil, are not attended with these inconveniencies, for they scarce ever create a necessity for their continuance—neither do they produce another, and a much greater inconvenience which the materials of the antibilious, and purging pills do in common ; this is by their stimulating the parts about the fundament, &c. They very frequently cause that disagreeable, and painful disease, the piles ; this we have often known to take place from the habitual use of these purging pills, which the patients had been using unsuspectingly, until warned against their use. Aloes has been long known to be necessary to this disease ; and every other drastic purgative, possesses the same properties, in a less, or greater degree, principally by their stimulating the rectum, &c. and of course inviting a greater efflux of humours to the parts, and weakening them, by exhausting their vital energy, &c. as strong stimuli applied to any part always does, by causing an efflux of fluids to the parts, in the first instance, and after their stimulant effects are over, leaving the parts in a weakened, and relaxed state, &c. So that any one who has just ideas of the animal œconomy, and the effects of medicines, will soon perceive the propriety of the cautions, endeavoured to be inculcated here.



## LETTER I.

*On the Causes of of Bilious Diseases, their Nature, &c.*



Qui bene judicat, bene curat. Baglivi Opera. p. 744.

THE bile is a fluid, of all others in the human body, the most conspicuous, if we except the blood; therefore, when it is by any means put out of its usual course, either by being regurgitated into the blood vessels, and by that means diffused through the system at large; and in this manner causing a jaundice; or by an increased secretion, and regurgitation of it into the stomach, by its usual course down the first passages being obstructed; in this case, it is accompanied with sickness, and vomiting, &c. and often with a feverishness, lassitude, and anxiety, &c.

If we inquire into the causes of these disordered appearances of the bile, we may generally trace them to some irritation, about the stomach, or first passages; for the liver and stomach sympathize very generally with one another through the medium of the biliary ducts, and intestines—as may be observed after drinking much of wine, or spirituous liquors; for in this case there are often a redundancy, and a vomiting of bile the next day: or any other substances irritating the stomach, such as rancid, or indigestible food, are common causes of increased secretions of bile; and when increased, it very readily gets out of its original courses, in various ways.

Professor Richter, of Gottingen, who appears to have paid more attention to bilious diseases, than is common in high latitudes, where they do not frequently appear—is much inclined to trace them all to irritations, about the stomach and liver; even the jaundice itself, he traces to this source. We have been long in the persuasion, that

in all cases of redundancies, and aberrations of the bile, were commonly caused by irritation, either of the first passages, or of the liver, or biliary ducts, although they are often caused by these sympathizing with distant parts; for it is a common occurrence for injuries of the head to cause a vomiting of bile; but this we believe never happens, unless when the membranes of the brain are injured; but the same thing takes place, commonly from any giddiness, caused by an unusual motion, as sailing, riding in a carriage, or turning round often, &c.—here we believe, that the sympathy subsists between the membranes of the brain, as the dura and pia mater, and the stomach, intestines, or biliary ducts, as they are parts more similar in structure, than the brain, and liver, although both reputed glandular; there is but little similarity in their structure, or modes of action, &c. one or other of which, when vicinity is not the cause of the sympathy we expect to find. For nervous ganglions, and vicinity of parts, are long known to be sources of irritations, being propagated from one part, to another, by sympathy; but that which depends on a similarity of structure, uses, or actions, is a later discovery, &c. but of a very extensive application in the animal œconomy.

There is another, and more wonderful manner by which biliary irritations are produced, that is through the medium of the senses; and the mind, which they consequently supply with ideas; for anger, or envy, &c. and other violent passions, have often excited increased secretions, and vomiting of bile; but this will appear the less wonderful, when we reflect on the various manners in which the senses, and the mind, act on the secretions, and functions of our bodies; and every separate one of the senses, has its peculiar irritations, which excites its actions in preference to all others, as sound to the ear, light to the eye, odours to the nose, and taste to the tongue, &c. but touch, or feeling, appears to be a more generally diffused sense than any other; for all parts of the body appear to partake of it in various degrees. But here we only wish to direct the attention to the distinction of stimuli, their

modes, and laws of action, in order to impress their uses on the mind, &c.

The bile appears in so many diseases, that it cannot mark a specific character in any ; but there is another circumstance to be learned, from its appearance in great quantities, we may be certain that there is some irritation present ; this is most conspicuously seen in choleras, or bilious vomiting, and diarrheas, cholics, &c. for in these affections, the irritation, and discharges, of bile, are in the greatest excess, so that the cholera is more purely a bilious disease, than any other, as its name imports ; and there are many other diseases, in which the bile shews itself, as hepatic diseases, fluxes, and fevers, principally those of the fall. But we do not intend to go into the particular treatment of each of these, any farther than the bile is a predominant characteristic.

Cholera takes its name from the Greek name of bile. It often arises without any preceding disease of the system, but those of irritation, and increased secretion : it is most frequent in the autumn, or summer season, when new fruits, &c. are common, and the weather changeable ; for a sudden cold, or obstructed perspiration, are very apt to be active causes of its appearance ; but any great irritation in the stomach, or intestines, such as indigestible food, rancid or crude matters in the first passages, and sudden cold ; by the sympathy which subsists between the surface of the body and the stomach, and from it by the intermediation of the intestines, and the biliary ducts, with the liver, where the secretion is performed. In some cases of diarrheas, and dysenteries also, the bile appears to bear a very conspicuous part, so as even to have acquired for them the name of bilious ; but unless there is some morbid or lasting disease of the viscera, they may be considered only as varieties of cholera, being less dangerous, but more tedious in their cures ; but there are many other symptomatic bilious appearances, which take place in different diseases, and states of the body, under various names ; but in all these cases, there are some irritations, either in the biliary organs immediately, or by their sympathizing with other diseased parts ; and conse-

quently as the morbid causes are so various, so also must the means of relief be. For instance, in our autumnal fevers there are always increased bilious secretions, caused by the great irritation which prevails in the stomach in these diseases; and in dysenteries, and diarrheas, the stomach and intestines are in a state of irritation, and consequently are attended with increased bilious secretions. And the pestilential fever, which is always propagated by infection, &c. takes its popular appellation from the yellow colour caused by the bile being obstructed in its course into the first passages, by irritation, and consequent constriction, either inflammatory, or spasmodic; which appearance, occurring before the fifth day, is a very bad symptom, as it is an indication of the violence of the irritation, and its consequences: but in the early stages of this disease, there are often appearances of bile making its way into the first passages; and of its being evacuated, either by vomiting, or by the intestines: this takes place, either before the irritation is arrived at such a height as to stop its course, or where it does not arrive at such a height as to stop the biliary duct, as in remittents, dysenteries, &c.

From the analysis of the bile, we can get but little information into the uses of this, or any other fluid, in the animal economy: or the causes or consequences of its deviations from a healthy state; in order to trace which, it is to the living solids that we must attend, the state of the vital energy, irritability, and inherent strength; and the causes of the morbid actions, or irritations, sensations, &c. We are to pay particular attention also to the habits of life, temperaments, sexes, and ages, which are most exposed to redundancies, and other irregularities of the bile. And from observations, we shall find the most profuse secretions in the young and plethoric males, particularly when they live freely, and indulge themselves in the use of wine, spirits, or fermented liquors, as cyder, porter, or punch; which last we consider as the most pernicious of all compositions, by its effects on the stomach; its continued use, destroying the digestive powers thereof, and producing a permanent weakness of it; and also by the excessive secretions of bile which it is a means of producing, at first



and the deficiencies, which are the common consequences of its habitual use; acids, and punch also, whet the appetite at first, but hurt it effectually by the long continued use of them; this is similar to the effects of all stimulants, when used over freely, they first produce strong action, but finally destroy it, by their suddenly destroying the vital energy; and it is in this manner also that spirituous liquors produce their baneful effects, especially when used in the early part of the day, &c. a detestible custom which some classes of men are unfortunately too fond of, whose principal study is mostly directed to objects no higher, than how to acquire them. The sight of such practices are very disagreeable to my feelings, from the many instances which have fallen under my own observation, of the bad effects of forenoon drams; it strikes me with a sensation of horror. Even the effects of bitters, are by no means innocent, especially to those constitutions, who may digest their food very well without them; and where the air is pure, and in the early part of summer, they are pernicious; for at this season, the vital energy which is accumulated in the winter, being set in action by the stimulus of the heat, is commonly active enough of itself; but additional artificial stimuli destroys it. Bitters may often be necessary in weak habits of body, whose digestions are imperfect, especially in moist, sultry, or wet weather, in the latter part of the summer, and autumn, taken with port wine, and water, especially where intermittents prevail.

In order to convey just ideas of the origin of the bile, and of its modes of secretion or separation from the blood, we shall endeavour to convey as concise a view of it as possible, in a few words—we may premise that all the fluids, which are separated from the blood, are secreted, and formed by their own peculiar glands; the kidneys secrete the urine; the glands about the mouth separates the saliva, and the liver is the gland which secretes the bile, or gall, and from thence it is conveyed by the ramifications of the biliary ducts to one trunk, the common duct of the bile, from whence there is another smaller duct, which occasionally conveys part of it to the gall

bladder, which serves as a reservoir to retain it until wanted, during the digestion and assimilation of the chyle, &c. whilst the bile remains in the gall bladder; it is rendered thicker, by its thinner parts being absorbed, and it becomes stronger. But this secretion of the bile has a peculiarity, not to be found in any other part of the body; all other secretions are made from arterial blood; but this alone is collected from venous blood, returning from the intestines, stomach, spleen, mesentery, &c. which takes this peculiar course, in its way to the heart; and is here distributed by the branches of a vein, called the porta; in which it has been remarked that the circulation is extremely slow, and the secretion a thick substance—although the liver itself, is rather an insensible part, yet it is very irritable, and very readily sympathizes with other parts, and by that means has its secretions increased, or disordered by them; but the biliary ducts are probably active agents in these offices, by their intervention and sympathies.

It is a property of all glands to have their secretions increased by irritation, when immediately applied to them; and many have their actions increased, even by sympathizing with other parts, where the primary irritations are seated; of this last nature is the liver, &c. Any acrid substance taken into the mouth, increases the secretion of saliva, by irritating the salivary glands; and any irritations of the eyes causes an increased secretion of the tears, by the irritation of the lachrymal glands, which secrete them. Irritation of the kidneys also increases the urine; and of the liver, or its appendages; irritations or sympathies, with some other parts, cause an increase of the secretion of bile. But here it is to be noted, that in case they are very often repeated, or long continued, the irritations lessen in their effects, unless their forces are increased; but after the action of strong stimuli, the weaker will produce little or no effect, for some time at least, until the energy, or susceptibility of the parts are again restored. These appear to be laws of the animal economy, and are found to prevail in their full force in the functions of the liver; a consideration of these circum-

stances will elucidate many of the appearances, and irregularities of the biliary secretions; as the redundancies and deficiencies of the bile—warm weather and a vitiated atmosphere, are predisposing causes to these redundancies; slight impressions may cause them to appear when so predisposed; such as cold air in the evenings, or mornings, getting wet by rain, &c. and fermented liquors, if too new, or flat, such as cider, or beer, to those unaccustomed to them.

Analysis of the bile has been commonly resorted to, as a means by which to detect its aberrations from a healthy state, as well as to investigate its properties and uses, in the animal œconomy; but although this mode of investigation might have been thought of much importance, whilst the pathology of the fluids was in its full estimation; it is rather a matter of wonder that, now, when we know that this, as well as every other secreted fluid, are as they happen to be formed by their respective glands, &c. we must turn our attention to these in particular, and consider the state and mode of action, which gives origin to the different states of the bile, for it and every other fluid, when secreted in large quantities, is commonly thin; but excessive irritation here, as well as in the kidneys, will cause the secretion to be mixed with the red blood, which here being dark venous blood, from which the bile is secreted, exhibits, when so mixed with bile, &c. a dark, sediment—such as Hippocrates named *atrabilis*, and the same which has been often seen of late, under the name of black vomiting. It is very proper that we should be acquainted with the chymical analysis of the fluids—but this leads us only a short way in our physical researches, &c. for what information could we obtain of the diseases of the salivary glands, from analyzing the saliva, or of the kidneys, from the urine; they will only shew whether there are any irritation present, or not.

Retention of the excretions, or their being suffered too long to accumulate in an unusual manner, are often the active causes of exciting a feverish disposition, especially in habits already predisposed by the action of heat, vitiated air, &c. this appears to be caused by the irritation

which these excrementitious substances produce, when acting on the irritable containing receptacles, and the sympathies, which they excite in other parts, and also their pressure on the parts in their vicinity, and the longer the retention, the more acrimonious does these excretions become ; which, together with the accumulation of the quantities, &c. often prepare the habit for serious affections.

From various analysis, the bile has been found to consist of a resinous substance, a bitter tincture, and a lymph, or watery part, but no oil as was formerly supposed ; the resinous part contains the colouring matter, and is supposed to be excrementitious, &c. and to assist, by its stimulus, in promoting the motions of the intestines, and to promote the propulsion of their contents ; for when the bile is not produced in sufficient quantities, there is generally a costiveness present. The tincture appears to be the only active part of it, which can enter the lacteals—and it has been thought to be of some use in animalizing the chyle, or preparing it to form part of the blood. The lymph is always coagulated, by its mixing with the contents of the intestines, and it is by this means rendered excrementitious ; the milk and the fat of animals contain an acid ; but all the other parts an alkali ; and the bile contains alkali in a large proportion ; it is therefore said to be highly animalized ; but the chyle yields no acid.



## LETTER II.

*Of the Treatment of Bilious Affections, &c.*

IT may be necessary in the first place, to take notice of a very common mode of procedure, which is followed by great numbers, for evacuating the bile. It is a very common opinion that the bile itself, is the primary cause of the numerous evils which take place, in those states of the body in which it appears. But if we will only carry our inquiries a little beyond the external objects of our senses, we may be led to inquire into the causes of the appearances; if we follow this mode of reasoning we shall find that there are always some irritation or stimuli present, for the immediate cause; these irritations or sympathies we have already inquired into.

But the pernicious tendency of considering the bile itself as the active cause in these cases is, that there are often very forcible means used for its evacuation, by strong emetics and purgatives which will no doubt carry off the bile; but at the same time, by their stimulant nature, they raise a commotion in the system, often worse than the original affection, and thereby increase the secretion still more, for the present, with the additional inconvenience of leaving a costiveness behind—this is always the consequence of the nostrum pills, which are in such frequent use, under the name of bilious, and antibilious pills, in which aloes, gamboge, rhubarb, scammony, &c. form the principal parts.

The different states under which bilious affections frequently appear, being already taken notice of, together with their causes and modes of prevention. Here we intend to explain the rational modes of treatment, divested, as far as in our power, consistently with the subject,

of technical terms; a few not in general use, we must indispensably use; but to these we shall be attentive to prefix concise explanations.

We take this opportunity of informing our readers, that we do not here mean to go into the nature, and treatment of all the diseases in which the bile appears, we only mean to trace them so far as it is a predominant symptom. All the varieties of choleras, from the most slight and transient vomiting of bile, or even the queamishness, which frequently takes place in delicate persons, in warm weather, and in females during the time of pregnancy, &c. are only milder varieties of affections, of the same nature; they commonly occur in warm weather, mostly in the forenoons, after having made over free with vinous or spirituous liquors the preceding day, or from the unusual motion of sailing, &c. In these mildest appearances, of the affection, there are seldom any farther medical assistance necessary, than drinking occasionally a little coffee, or any other mild diluting liquor, such as warm milk and water; or if convenient, gruel, or broth, in order to soothe the stomach, and to dilute its contents, &c. Drinks of this nature, are by far the most efficacious, which we are acquainted with in sea-sickness; for we have often used, and recommended them to others, and always found relief from a cup of coffee, gruel, or fresh broth, every hour or oftner. And although it does not always produce the desired effect in the first, or second draught, it will, we can venture to say, to a certainty, if persisted in, and that more effectually, than any other application yet known. And as this is as languishing as any sickness, it also merits some consideration.

That uneasy sensation, which so commonly attacks wine bibbers, &c. the next day after an over dose of liquor, accompanied with head-ach, sick stomach, &c. is best relieved by rest, and warmth of the skin, and drinking a cup of coffee, gruel, broth, or any other such fluids, which the patient may prefer, through taste or convenience, &c. And so soon as the sickness is removed, exercise in the open air, such as riding or walking, &c. may advantageously be had recourse to—here it appears very plainly,

that the affection of the head, is only derived from sympathy with the stomach, both in the first and second states of intoxication; for in the first it is very evident, that the stimulus applied to the stomach, affects the brain, or rather perhaps its membranes, by sympathy, long before the liquor itself, could have time to make its way so far—and after the stimulant effects are over, the sensations left behind, are pains, from the effects of the former stimulus, and present torpor.

The head-achs accompanying these affections, are evidently caused by the sympathy, which so very generally prevails, between the stomach and the membranes of the brain, as there are no visible connexion unless by nerves, or membranes, there may be a similitude of structure—but however the sympathy is conveyed, we may easily prove it to be one of the most constant in the human body; for every disorder of the stomach, causes head aches, whether they are caused by indigestible food, by spirituous liquors, or fevers, &c. And in many cases, the head-ach gives us the first warning of the affections of the stomach. A stoppage of perspiration also, by cold applied to the surface of the body, often causes head-achs by sympathy, which are communicated in some cases through the medium of the stomach; for we do not know of any such direct sympathy between the surface of the body and the brain, as there is between it and the stomach; and also between this last and the brain—for it has been often remarked, that getting cold by a moist air, was one of the most general causes of irregular secretions of the bile; the sickness of the stomach, and head-ach, being an index of the state of the stomach, on which these causes act.

The cholera not being a specific disease, there are many varieties of it; but this is the case, even with the most purely specific disease we are acquainted with, as the small pox, for instance. But affections which are not specific, may be rather considered as uncertain concourses of symptoms in the constitution, which may proceed regularly, and similar to one another, in many different persons; but the various constitutions, habits, and temperaments, vary; even the small pox and measles, and much

more do the other uncertain concourses of morbid actions, which cannot produce their likenesses. Choleræ most commonly appear in the latter end of summer, or in the autumn; and from this circumstance, we may often collect their causes. Inflammation is to be derived from the same sources; for there is always a connexion runs through diseases, for which we are sometimes to search in the patient's habit of body—but more frequently it is from external sources, and conveyed through the medium of the air, food, drink; or by exercise; for there is scarce any disease so uncommon, but we may find some connecting causes between it and others, only with different grades in their violence.

The diseases of the bowels with which children are so liable to be attacked, in the second year of their age, in all the large towns of the United States, appears to be very much of the same nature as bilious affections: for they are commonly excited by the irritation of their teeth, cutting their way through the gumb, &c. or by worms, and often by both at the same time, when rendered weak, and irritable by the heat and impure air of towns, with these additional stimuli; and sometimes by the use of fruits. From this it will appear that gentle laxatives, in order to clear the intestines of their contents, such as castor oil; or Sal. Rochel, and mild antimonials at night, with warm bathing, never should be neglected in these cases: if there is reason to suspect the presence of worms, as a cause of keeping up the irritation, then some calomel united with purgatives must be used; their drink should be warm and mild, such as gruel, milk, &c.

Choleræ, are often caused by eating crude, acid, indigestible fruit, or rancid butter or fat, or tainted fish, or other animal food; together often with exposure to cold air, from the sudden changes of the weather and an irritable habit, or one very susceptible of morbid impressions.

When the bile appears in unusually large quantities in fevers, or fluxes, they are named bilious from these appearances, but although we do not suppose it to be the cause of either of these affections, nor to have any share in



their natures, yet we confess, it is a cause of variety, and although only an accidental appearance, it shews the state of the first passages, in a very clear light; particularly when it passes freely, and in large quantities into them, it is apparent that there are some irritation, or morbid action present in these parts, or in the liver itself. But the bile getting into the intestines, is not a certainty that the ducts are clear of obstructions, for it often passes large concretions here. Great irritation causes either an inflammatory, or spasmodiac affection of these parts, by which means the entrance of the duct is constricted, as by a valve, the inflammation here, may be either erysipellatose, phlogistic, or inclining towards either, as the habit of the body is firm, or very weak and nervous: but there are, we have much reason to be persuaded, often something of a spasmodiac nature in this part, when irritated.

Choleras are most frequent in the young, lax and plethoric, where the fluids bear a too great proportion to the strength of the living solids; and where there are over great susceptibility of morbid impressions, the almost constant vomiting and purging here denotes a great degree of irritation, and in order to allay this, warm fluids have been very properly recommended, warm milk by itself, or mixed with water, is very useful, or broth, gruel, &c. or any other thin, warm fluid, which the patient is most fond of; but there is another circumstance of great importance in these affections, that is, to keep the skin warm, and if possible to promote a perspiration, and in order to succeed, in this warm bathing is essentially necessary either the steam bath, or immersion in warm water; and immediately afterwards, the patient should be put into a warm bed, this is a mode of treating the affection which we can recommend as the most efficacious of any which has ever been used; and in case the irritation of the stomach is not allayed by these means, then oil of sweet Almonds, or even common salad oil may be drank to the quantity of several ounces, giving two or three table spoonsfull at a time, and repeating it occasionally; oil and milk have been long known to be very powerful in relieving

irritation of the stomach, from acrimonious substances, or even poisons; but not so generally for this disease.

Choleras are vomiting and purging, with great evacuations of bile, accompanied with sickness, langor, and sudden loss of strength—if any affection deserves the name of a bilious disease it is this, &c.

But as there are many varieties of this disease from that which only causes a slight queamishness of the stomach, with an accidental vomiting to the violent affection, which kills in a day or two; the treatment must, of consequence, be accommodated to the violence of the affection, there is no disease more certainly caused by irritation than this, and there is much reason for believing its seat to be in the stomach, or neighbouring part of the intestines, and if we were to admit a modern very fashionable German term, it would appear to be of a Gastric nature, more properly than any other we are acquainted with; for it does not appear to be accompanied with inflammation, either phlogistic or erysipelatous, but only irritation. And the recurrence of vomiting, is more of a spasmodic than of an inflammatory nature, and in this manner it is to be treated with warm bathing, soothing demulcents, such as oil, or even laudanum in small quantities, and often repeated, as it is not apt to answer on the first application, and may disagree with the stomach itself, &c.

The large quantities of bile which appears in fevers, must depend altogether on the state of the patient's habit of body, and that of the disease; particularly the presence, or absence of any inflammatory disposition, or an irritable, and uneasy state of the stomach, which emetics, commonly increase, and particularly when an inflammatory diathesis is present; in such situations, gentle laxatives, answer best; of Rochal Salts, or castor oil, to allay the irritation, and if accompanied with an inflammatory disposition, antimonial powder at night will be useful. But we are to aim at soothing, instead of increasing the irritation of the stomach, for here vomiting raises such perturbation in the system, from the commotion caused by their operation, as is often very difficult to allay, and dangerous in its consequences; even in dysenteries, emetics are not

at all times advantageous, nor even safe, especially those composed of ipecacuanha, on account of its astringent properties, and its aptness to produce tenesmus—but the soothing plan is always the most preferable, where any irritation is present; and this is best effected by the neutral salts, or castor oil, or any bland exposed oil, as that of almonds may answer; and in case the inflammation runs high, then antimonial powder should always be used at night, in order to promote a perspiration with warm drinks, warmth of bed, &c.

It has to many appeared unaccountable how it happens, that in some situations, and in particular patients, there is a deficiency of bile, in consequence of the effects of warm climates; but this we hope will be as easily explained as its excess, which as we have observed is always most frequent in the young, and plethoric inhabitants of colder climates, &c. who have not been much exposed to heat, but are lately arrived in warm climates, and consequently retain their vital energy unimpaired; which are readily acted on by the external heat, or changes of the air, or other causes. But the deficiencies of the bile take place in those, who have been in some measure exhausted by a preceding exposure to heat, and other stimuli, and are adapting more abstemious habits of life—especially when they become discontented, and debilitated by the effects of heat, and spirituous liquors. Here it is very evident that gentle exercise in the open air, relaxation from thought, or business, and mild stimuli, are very advantageous; such as pills, composed of Venice soap, and calomel, not exceeding one grain of the mineral, to each dose; or the blue pills prepared of extinguished mercury, and the soap, of each two grains are preferable; the soap and bitters here, in some measure supplies the place of the defective bile.

*The Information to be Derived from the Appearance  
of Bile.*

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THE information to be derived from the appearance of bile in the system, has not been properly attended to, either by the advocates for, or against its importance in diseases; for some will have it to be of itself the primum mobile, of both health, and diseases—but although we do not believe it to be such an active agent, we may collect much information by attention to it.

The appearances of the biliary secretions, may, by those who attend to them, serve for very useful indications, whereby to discover the state of the stomach and of the liver; for by attending to all its various appearances in the first passages, in the eyes, on the tongue, and in the skin, &c. It will often give us more true information of the state of the viscera, than even the pulse itself, or than any other external appearances; not as the cause of these affections; for with them it has nothing more to do, than the water in a dropical person has, with its own collection.

Although the bile appears so conspicuous as to attract much attention, its uses in the body are but imperfectly understood, it has been analyzed, often enough to convince us of the insufficiency of this mode of investigation, in discovering the causes or consequences of bilious appearances—or the properties of either fluids, or solids, or their modes of action; the bile, and the blood are different in colour from one another; and also from every other fluid of our bodies. And, therefore they are equally conspicuous wherever they are diffused. The eye can soon detect their presence, but the cause which brought them there, may be found out in another manner, from the few certain sensible facts, of which we are already in possession.



From these we learn that the appearances of the bile are varied by many causes, as by irritation, inflammation, or by spasms; and also by concretions, generated in the biliary ducts, or in the gall-bladder. It may be proper, to attend to each of these states in their order; and to their causes and consequences in the economy.

Irritations are caused in the biliary tubes in various ways, as by external cold affecting these parts through the medium of the stomach, by injuries of the head, through the same medium, but more frequently, and certainly, by some irritating substance in the stomach, or first passages, as indigestible food, or liquor, particularly punch, or crude, acid vegetables; or the effects of marsh miasmata, or of infection—but these are taken notice of in other places; we would only premise that this is only irritation. But inflammation may, or may not follow as a consequence of any of these irritations, and that, in proportion to the state of the patient at the time, and the strength of active causes, whether external cold, an injury of the brain, infection, &c. we believe that miasmata seldom causes active inflammation. A spasmodiac affection may also follow irritation, if the patients habit of body be disposed to it, from being irritable and weak; for we are persuaded that it altogether depends on the habit of body in which the patient is, whether an irritation causes only increased secretion, true phlegmon, erysipelas, or spasm.

Some useful indications with respect to the use of the bark, may be taken from the appearances of the bile, &c. for if there is a great secretion of it, apparent in the first passages, it shews on its appearance, that there are some morbid irritation there, especially just after its first appearance: which should be allayed, by lenient sedatives, such as castor oil, or salts, &c. by which the bile is carried downwards and also the irritation allayed; but when there are no inflammatory disposition, an emetic may very properly precede the use of the laxatives, as in perfect intermittents, but after the irritation is by these, or similar means allayed; in a few days the bark may be exhibited, notwithstanding the bile may still appear.

The bile commonly is perceived first in the eyes, and from them and the appearances of the tongue, we commonly derive our indications of cure; but it sometimes appears in the skin. When it appears here we may be certain that there are some obstructions to its entrance into the first passages, either by inflammation, spasm or concretions in the tubes, &c. and in either of these cases the bark is highly improper, in the early stages of its appearance. Bark has been discovered by my preceptor, Dr. G. Fordyce, to be a very useful medicine in the erysipelas, and also in many cases of an erythematic nature, owing merely to a weak and irritable habit of body, which has been by some observers taken for true, or (Phlogistic) inflammation, yet we can without hesitation assert, that it is always improper, and even pernicious in all cases of inflammation accompanied with rigid fibres, and great inherent strength, and irritation at the same time, although active inflammation should not have taken place. When the tongue is tinged with bile, and dry or brownish coloured, the bark is generally improper, for this indicates a degree of irritation, and fever, not of that nature in which bark is useful.

It is to be observed, that although a slight irritation will cause a plentiful flow of the bile into the first passages; because in this state there is no obstruction to its getting there; yet a greater degree of irritation causing inflammation, will altogether obstruct its passage thereto: by shutting up the entrance of the duct into the intestine, through the coats of which it passes for a considerable distance, before it enters into the cavity of it, which by being of a muscular nature, inflames, and becomes tumefied; this appears to be the state of these parts in the pestilential fever, and spasms of the intestines are common, but a spasm of the ducts, we believe, rarely ever takes place, as they are not muscular.

The generation, and nature of biliary calculi, belong more properly to this place than any other, and for this purpose the bile would appear more fit to form concretions, than the urine, or indeed than any other fluid of the human body.—It appears that whenever a solid sub-

stance, not possessed of the vital properties, is once formed in any of the cavities of the body; other parts will adhere to, and increase it, probably by some principle of attraction, which appears to pervade similar substances in the human body; and it may rather be named similar, than elective attraction, as this latter term is monopolized by chymistry, but the similar attractions were noticed by Glisson (de Hepate) long before either that of gravity, elective, or electric, were investigated. The teeth being the only solid part of our bodies, which are visible in any of the cavities, we daily perceive concretions formed on them, so far as it is not rubbed off by the action of the food, in chewing, or by the lips, &c. this is the tartar of the teeth so named. A nucleus, or kernel, may be formed in a cavity, in various ways, as by a solid body getting into any of them, either from without, or formed there by the mucus, which sometimes happens in the urinary bladder from inflammations, or any other cause, producing a coagulation of the lymph, which by attracting the salts of the urine, soon forms a nucleus, which constantly increases by the same means. A biliary concretion is produced probably by coagulated bile, and lymph, secreted from the interior coats of the gall bladder, but biliary calculi are common in other animals, particularly horned cattle in the winter, when they feed on dry food, such as hay, &c. and are cured by succulent food, &c. as the young grafs in the spring.—Glisson learned this from the butchers; but biliary concretions are so very common in animals, that we cannot always consider them as necessarily causing disease, &c. and so long as they remain in the gall bladder, they do not appear to be the cause of any uneasiness, or even of a discolouration of any part of the body, by aberrations, or obstructions of the bile. But as soon as any of these concretions get into the tube which conveys the bile from the gall-bladder, to the intestines, although this duct is capable of great dilation, sometimes to two or three inches in circumference, yet the passage of the bile is often obstructed in this manner; but Richter mentions a gall stone, of which he also gives a drawing, which although

three inches in circumference, the bile found a passage by it into the intestines; for their contents were coloured by it. From this we may learn that the biliary duct is very dilatable, but not elastic, for when once it is dilated by the passage of a gall-stone, it commonly retains the same width ever after.

It may now appear plain enough, that irritation, and its consequences will cause obstructions to the natural course of the bile, and also an increased secretion of it.—Therefore, on its first appearance, bark, or stimulants are very improper, for they increase the irritation, and the inflammatory disposition; but either of these states does not continue long the same—for when once the bile is diffused through the system, it often remains visible after the cause of its appearance is removed; therefore bark, and stimulants may be very necessary, long before its disappearance, although not at first, as we may often prove in remittent fevers. But as to the production of the (*atrabilis*) black bile, as it was named by the Ancients, we may distinguish two varieties of it: First, that which is caused by a concentrated bile, where it is both thick, and black, as it assumes many varieties of colour, and consistence, even in health—for sometimes it will be pale, and watery, and at other times very yellow, and of a thicker consistence.

But the appearance of it in the first passages, from whence it is cast up by vomiting, or discharged by the intestines, is often caused by sudden commotions of the mind, or irritation of the part, whereby the bile which was stagnant in the gall-bladder, and there inspissated by the absorption of the thinner part, as always happens whilst it remains in the gall-bladder; for it is generally thicker after having remained for some time, and so expelled by any sudden emotion. But that coffee ground like appearance which takes place in the pestilential fever, and on some other occasions, appears to be a substance of a different origin, in the investigation of which we should trace it to its source, not by analysis, but by dissections. It is very plainly the red globules of the blood changed to this colour by the bile, and juice of the



stomach, which although its action is increased, by irritation appears only capable of secreting a fluid, at the most; but the matter of the black vomiting is evidently from the liver; for the red particles of the blood, can pass from the blood-vessels of the liver, to the biliary tubes, and the liver being so very irritable, must partake of the affection of the first passages; and its blood-vessels are so very readily previous to any fluid from the bile ducts, *et vice versa*, from them to it, very readily admit the red particles of the blood into the pores of the biliary ducts, where it gets coloured by the bile of a dark colour, and is so discharged.

The jaundice is so closely connected with hepatic affections, that we cannot with propriety pass it over in this place; for both it, and dropsy, are common consequences of diseased livers, of which they appear to be only symptoms, as we consider the dysentery to be of fevers, when in its worst form, although it is also a concomitant of diseased viscera. It is not from a desire to generalize, that we make this remark, but we hope from a more useful purpose; that is, to trace morbid affections to their natural sources; for otherwise we could have no rational idea of the means of cure, unless we consider it in this light. The seat of jaundice is often in the biliary ducts, or their ramifications in the liver; but this disease sometimes takes place, without any morbid affection in either. An instance of which we discovered three years past in a young man who led an irregular course of life, but of whom we had not the attendance, but discovered it by dissection. The liver, and its appendages, were in a healthy state, although he had an obstinate jaundice; but the spleen was two pounds, nine ounces in weight, and it so forcibly pressed the stomach against the liver, that it obstructed the bile, as effectually in its course, as though the duct had been tied with a ligature. This person's name was Watkins, a recruit in Captain Claibourne's company.

There is a variety of jaundice attacks children, and young persons, in the latter part of the summer, or autumn; particularly after eating any thing which is difficult of digestion, as crude fruit, fresh meat, &c. but al-

though it causes sickness, and yellowness, it is seldom obstinate—it appears to be caused by sympathy with the stomach, which communicates its action to the biliary pores, and appears to be nearly related to cholera, for here the secretion of bile is much increased; although seldom attended with a spontaneous vomiting, it is generally easily cured in a few days by emetics at first, in order to discharge the offending matter from the stomach, after which bitters, chalybeats, &c. soon finish the cure.

The biliary ducts are often obstructed without causing any other disease than a jaundice, which is caused by the bile being carried with the blood, and diffused all over the system, and appearing in the skin and white of the eyes. Very little of a bilious tinge appearing in the excrements, but much in the urine, which assumes a yellow colour, much deeper than common, denoting its abundance in the blood, and its exclusion from the first passages.

But when the liver is diseased, the bile is sometimes obstructed by tumors in its substance; before it even gets into the large trunk of the biliary ducts, and is stopped in the minute pores, from whence it is taken up by the extremities of the great vein and carried to the heart, where it may produce a diseased action, and in the skin it produces a prurieny, or prickling. This is one instance of a fluid producing a diseased action—and also, of an error *loci*, but the scurvy affords others; for in both these diseases, the healthy nature of the blood is destroyed—the coagulable lymph, and red particles being dissolved hæmorrhages, take place on slight occasions, with a disinclination to exercise, sleepiness and weakness, of mind and body. We are to remark, that in the secreting parts, there are different conformations in the extremities of the arteries, from those of the veins, which these parts seem designed to support in order; but weakened glands cannot prepare their secreted fluids the same, as the healthy do, and consequently the secreted fluids will be in a different state; and hence diseases ensue. Therefore when the healthy actions of the liver are changed, its secreted fluid is no longer good bile, consequently it cannot perform its function in the formation of healthy chyle, from our

food, and in the separation of it from the aliment, and the promotion of the excretions of the intestines; for in order to form good chyle, the stomach, and the bile, should be in a healthy state: for when acrid fluids flow through the vessels, they will irritate and increase their actions, and obstruct them by inflammation; or if they remain permeable, their secretions will be increased; in the first of these situations it appears, are those who labour under the most violent degree of the pestilential fever; here the violence of the irritation, totally obstructs the exit of the bile, into the first passages, therefore it must be regurgitated into the blood. For even in dead subjects, fluids may be injected from the biliary ducts, into the branches of the great vein, by which means it is diffused over the system. This indicates a violent irritation, when it takes place early in this disease, and it is generally accompanied with a costiveness; but a less degree of irritation, causes a discharge of bile into the first passages, with a lax state, of them or diarrhea, which is a favourable symptom in this disease; and this appears to us the only rational explanation which can be given of these appearances, &c.

But the most frequent cause of jaundice, is by biliary concretions, formed in the gall-bladder; these are most frequent in the inactive, and indolent, or those who are confined to sedentary modes of life, they are principally formed of inspissated bile concreted together. Something of a similar nature may be observed in the horned cattle, when killed in winter, but very rarely in summer, after they have been sometime fed on new grass; hence grass-roots, and infusions of grass have been used in this disease, &c. and some have eaten the grass itself; and whey has been used advantageously in the mornings, as a very pleasant diluent, &c. But a more expeditious method of treating this disease, is by beginning with nauseating doses of emetics, so as to vomit two or three times, or what will answer as well, to get a sea sickness, if it is convenient, and afterwards to give gentle laxatives, with diluents, as the neutral salts, or castor oil, &c. but if it proves obstinate, the emetics must be repeated every three or four days, or once a week, interposing laxatives. But if this

course does not succeed, and there is no fever, or inflammatory disposition present, recourse may then be had to stimulant purgatives, with calomel, &c. but the mercurials should rather be given in small and repeated doses, than in such large quantities, as has often been used—one grain is my common dose, and three my greatest, once a day or every two days, &c. with *sapo. venet.* and some active purgative, as aloes, scammony or gamboge, &c. when there is an intermittent, or dysenteric disposition, emetics are often indispensable; especially where the first passages are loaded with phlegm, by reason of an inactive state of the absorbents, and in torpid habits, unaccompanied with any inflammation: but where the liver is diseased, vomiting is a dangerous practice, for by the perturbation it causes, when there are any morbid irritation about the liver, as often happens in hepatitis; great secretions of the bile, with vomiting, often continues a long time, returning on every slight exposure to cold, the treatment comes under the succeeding heads.

But it sometimes happens, that the irritating cause is situated in the stomach, or intestines as they are subject to inflammation, as in the pestilential fever &c. and sometimes when a schirrus affects the stomach. And we may be convinced that irritations of this part causes a vomiting of bile; by what takes place from emetics. There is another state, which is in direct opposition to the last; this is a deficiency of the secretion of bile: on the first impression of the subject, there appears to be something mysterious in it, but, it is to be observed that this state never is the first effect of heat, the increased secretion is always the first irregularity; the deficiency is later in taking place, and from following this simple hint, we shall be able to follow it through all its vicissitudes, its causes, and cures.

It will be evident to any person, who has had some experience of the effects of warm climates, that heat weakens the whole habit of body, especially where the additional stimuli of spiritous liquors have been used at the same time; these effects are so common, that every person, of the least experience, in warm climates, must



be convinced of the fact ; and when weakened, and the patient from experience, adopting a more moderate course of life, weakness, low spiritedness, and a deficient secretion of bile follows, and in some cases a watery, and insipid bile is formed in small quantities ; and this state is frequently accompanied with a wavering, fearful and irresolute turn of mind ; it is in such affections, that the bath waters, are most salutary, together with the salutary, exercise of going to such places, and the amusements found there ; but as this is not within the power of many to procure, they may find a substitute at home, by artificial imitations of them, by about ten or twelve drops of tincture of iron in spirit of salt, to a pint of warm water, or by other means. Whey or milk if it agrees with the stomach, drank in the mornings, and walking, or riding is useful ; and saponaceous, and stimulant purgatives in small and repeated doses, as venice soap, and trituated mercury made into pills, one or two of which may be taken occasionally.

What at first appears more irreconcilable with our principles is, that cold, or moisture applied to the surface of the body, often produces increased secretions of bile. This appears to be caused by the determination of the vital energy ; and also of the fluids to the internal parts, thereby increasing the secretion to an unusual quantity. Affections of the mind in delicate persons, and sea-sickness, also produced increased secretions of bile, or any uncommon, or unusual motions, are apt to produce it, probably often by an instinctive contraction, which in such circumstances take place ; or from a sympathy between the membranes of the brain, and those of the liver, between which the consent of parts is obvious, in the vomiting of bile, which so commonly takes place, in cases of injuries of the brain, &c. for although the liver is, as many other of the most irritable parts are, rather insensible, even under diseases of its glandular substance ; it nevertheless appears to be very irritable, on the application of stimuli, either immediately, or by sympathy.

My readers, it is hoped, will by this time be inclined with me, to believe, that the first effects of heat on pletho-

ric habits especially, whose vital energy is great; as well as those of other stimuli, applied to the system, is an increased secretion of bile; but in this case it is obvious that the heat must act on it by sympathy with the surface of the body; for the heat of the interior parts is in general no greater in hot, than in cold weather. On the first application there is a small increase of the interior heat, which is effected in the same manner, as by other stimuli, or exercise. The secretion, therefore, always appears to be increased by heat, in the first place, especially where the common custom of drinking fermented, and spirituous liquors, is followed at the same time, by increasing the causes, as we may often observe, as well on the access of summer here, as in warmer climates. It is to be wished that particular attention may be paid to this rationale of the operation of stimuli, and vital energy in explaining the phenomena of irritability.

It will now appear obvious, that the best method of obviating an increased secretion of bile, is to avoid the causes which are known to increase it, as far as in our power; the free use of liquors, either fermented or spirituous; especially their excessive use, may be avoided with the greatest advantage; more especially, on the first months, or years, of exposure to a warm atmosphere; and this single circumstance well attended to, will be found a very powerful means of the preservation of health, where exposure to heat is unavoidable, especially where the air is pure and dry, where of consequence, hepatic affections are most frequent. But where the air is moist, or vitiated with noxious exhalations, the mode recommended, will not be so successful, especially where intermittents prevail. But in the former, the food should contain much of the vegetable, and less of animal substances—and at the same time, what is used should be easy of digestion—preparations of rice, Indian-corn, or wheat appears to answer well, and the regular use of coffee, or tea, is of material advantage. But when extraordinary secretions of bile appear, by vomiting, sickness at the stomach, or head-ach, &c. instead of following the common custom, of taking emetics, which always excite a perturbation in

the parts adjacent, it is more advantageously carried off, and the irritation allayed at the same time, by taking castor oil, or Rochel salts, or any other of the neutral salts; as all these are of a sedative nature, or what is commonly expressed by cooling, or quiescent; half an ounce of the oil may be dropped into a little water in a tea cup, a dram or two of compound tincture of fenna will render it less nauseous. Many persons are partial to the use of acids in warm weather, and in tropical countries. They are those however, who are guided more by their present appetites, than by experience, or reason; for acids however agreeable they may be to the taste, &c. will eventually hurt the digestive powers of the stomach, if their use is persisted in. They appear at first to whet the appetite, and like forenoon drams, or bitters, &c. create an artificial inclination for food; but a habitual use of them never fails to destroy the digestive functions, apparently by destroying the mucous lining, and the coats of the stomach—as Sir J. Hunter, always found it flaccid and weak in dram-drinkers.—As to punch, that noted combination of the two ingredients just mentioned, we are sufficiently warranted, in considering it one of the most pernicious compositions, that ever was in common use. In India where the materials of its composition are in the greatest abundance, and perfection, it is never used by those who pay attention to the preservation of their healths—this is the result of experience; for in such situations, attention to health is an object of much importance—wine never produces these deleterious effects so conspicuously; it is therefore, preferable in general, to malt liquors, &c. because they are seldom to be procured in good order, in warm climates; and from experience we know that when flat, they are hurtful. But as the water is always disagreeable on board of ships, a small quantity of any pure spirit with it, may be indulged in at dinner, and towards evening, but this should never be indulged in the mornings. Emetics for carrying off increased secretions of bile, are not a commendable practice; they irritate and weaken the stomach, over much.

*Of the Hepatitis.*

IN forming a judgment of the diseases to which the liver is liable, we may turn our attention to those parts of the world where these affections are most prevalent; and also to the peculiar structure, and functions of the liver itself.

There is no other part of the world, where this disease is so prevalent, as on the coast of Coromandel, in India, and in the adjoining country which is very warm—the thermometer is commonly between  $90^{\circ}$  0. and  $100^{\circ}$  0. The surface of the earth is in general covered with a white sand, and a very thin vegetation, and scarce any wood. Madrafs, the Presidency, is in the  $13^{\circ}$  0. of north latitude, this is the region of hepatic affections; but in every other respect, when we consider the comparative warmth of the country, it is a healthy situation, so that one half of the diseases are of this nature. These affections are peculiarly severe on sailors, or soldiers, and indeed few Europeans who reside any considerable time here, escape this disease. Exposure to the heat of the day, and the abuse of spirituous liquors, and exposure to the cool night air, after the heat of the day, would appear to be the principal exciting causes. It appears to be more dependant on the simple heat, or cold of the air than any other disease, with which we are acquainted.

When we consider the peculiarities of the liver, we shall be more competent to judge of the causes of this disease; here the circulation of the blood is remarkably slow, being computed only one twenty-fifth part so quick, as in other veins of the same diameters; and the hepatic nerves are furnished from ganglions, and are probably more irritable, and less capable of sensation; but these properties are common to all the viscera—but although its glandular substance is but obtusely sensible, its vascular and liga-



mentous parts are acutely sensible when diseased, as in the acute inflammations of these parts; consequently in the acute hepatitis there is great pain, feverishness, and quick pulse; although in the chronic affections, there is but little sensation of the part, neither does the arterial system appear to sympathize with it, as the pulse is seldom much affected; so that it is often far advanced in its progress, before it is perceived, and in this situation, it may be first known by a dead weight of the part, and a numbness, externally; this last sensation is well known to me, having been in this state myself, three or four years—but now happily clear of it these seven years past; it is readily perceived on exercise, such as the jolting of a carriage, or riding on horseback, running, leaping, or swinging; such experiments used gently, may often be necessary, in order to determine the real seat of the disease; and when the symptoms are obscure, criterions of this nature may be tried.

Examinations with the hands, may often determine whether this disease is present; especially when the fore part of the liver is the seat of the disease; it may in some cases of this nature be perceived by the physician, on application of the hand to the right side, a hardness, and tumour of the part may be perceived, under the short ribs; or the patient will perceive an uneasy sensation, or pain, more or less obtuse, according to the situation of the part affected, and the extent, and nature of the disease. But when the affection is towards the back part of the liver, or in the upper part, towards the diaphragm, and under the short ribs, it is more difficult to detect, as may be easily understood by any one who examines these parts anatomically; when in this situation, it will be necessary to examine the patient more strictly, under the clothes, by putting the palm of the left hand on the back, and with the right hand, pressing inwards with the fingers, under the short ribs. By this means one who has had some experience in this way, will commonly be enabled to determine in doubtful cases, whether there are any morbid resistance between the hands, or the patient will feel an un-

easiness, when the diseased part is pressed on; these are the most certain ways of examination by the touch.

Sometimes it happens that the gall-bladder being full of bile, from some obstruction to its exit, causes a tumor to be perceived, on touching it with the hand, but it is seldom difficult to distinguish from that caused by the liver, it being circumscribed, round, and seated more towards the pit of the stomach, than the liver is. Besides the means we have mentioned of detecting a diseased liver, there are other symptoms which appear spontaneously; almost every person has heard of a pain in the top of the right shoulder, as a symptom of this disease—this remark is as old as Hippocrates; but although this pain is seldom present without the disease, and is therefore an almost infallible symptom of it; yet the disease is often present without it—and so far as our experience goes, oftener so than with it. A pain in the back part of the left shoulder is, we believe, as frequent in this disease, as that of the right; and the shoulder pained, appears in a great measure to correspond with the part diseased; for when the right side of the liver is diseased, the pain is in the right shoulder, *et vice versa*, a shooting pain, from beneath upwards, under the sternum, accompanied with a tickling cough, is a frequent symptom of hepatitis, especially when the superior part of the liver is affected, and a brownish color of the skin, or, sometimes inclining to a dead white, especially in old cases, and in debilitated and delicate constitutions, there is commonly an alteration, in the external appearance both of the countenance and the color, different from that of health.

Next to the effects of heat, spirituous liquors produce the most pernicious consequences on the liver, and its appendages, we have much reason to believe, that they are more active in their deleterious effects, than the warm climates, and all other circumstances together, for even in the most temperate countries, those who make over free with spiritous liquors, are very frequently affected in this part, if not with active inflammation, or schirrus, as often happens, they become hypochondriac, or dropical. These states of the liver are more frequent than

has been commonly supposed, but they escape detection, by reason of the general aversion to the inspection of diseased bodies after death, which prevails in private practice. The patients are apt to have a jaundiced, or dropical appearance, and the relatives of the deceased, and too often the practitioners, are content, when they can get a name for the disease; and seldom wish for any farther investigation of causes and effects, by dissections. Spiritous liquors appear to produce their deleterious effects on the irritable part of the system, in a manner similar to those of a warm atmosphere: for, when they are used in large quantities, for a continuance, they so far exhaust the vital energy, as to prepare the way for obstruction in the liver, spleen, &c. even in temperate climates, but much more frequently in warm countries; it must however be acknowledged, that there are some constitutions so very happily formed, as to bear the greatest excesses for a long course of time; even in countries peculiarly disposed to produce these diseases, in others: but their numbers are so small, as not to encourage others to follow their example; for even the most healthy of these, we are sufficiently persuaded, would be more healthy, and also longer lived, with moderation. The torpid, and phlegmatic, are the most apt to bear excesses with impunity, in all climates, but especially in warm countries, but the lively and delicate bear excessive stimulants worst: but although this may be taken as a general rule, there are many affected, in which we cannot foresee any existing cause, why they should be more susceptible of this disease, than others who escape it: but we may from circumstances, collect this useful piece of information, that the action of some stimuli have generally preceded the diseased state of the liver, whether it is great heat of the atmosphere, or spiritous liquors, or both. But a circumstance of more difficult investigation is, where abscesses of the liver are caused by injuries done to the brain, as in fractures or contusions of the scull, here it is very evident, that there must be a constant sympathy between these parts; but the manner, in which it is propagated, is not to be traced *à priori*. Spiritous liquors

taken into the stomach stimulate it very strongly, and this action is soon communicated to the neighbouring parts, either by immediate contiguity, or by sympathy; for it in a short time affects the brain, long before it could have got there by the circulation, and the mind is affected by it, and the whole nervous system: the circulation also is very soon quickened by it, as we may perceive by the fulness, and hardness, of the pulse. When the quantity is moderate, a cheerfulness, ensues with an increase of animation. And the stimulus is communicated to the liver in a short time, by means of the biliary duct, and the intestine; but the liquor itself is probably not totally changed by the action of the stomach, until it comes into immediate contact with these parts, in its course downwards; by which means it will stimulate them directly; from whence the stimulus is carried along the biliary duct to the liver, whereby large secretions of bile are promoted, from whence we may trace the vomiting of bile so common after a debauch of wine or spirits, &c. inflammations, of glandular parts being very different from those of other parts; besides the liver has many of the peculiarities of other inflamed glands; for in it the affection appears to be produced by irritation.

This morbid action is often produced by the sympathy of the liver, with other parts of the body; as there is no other part, where these sympathies so frequently take place as here, the frequent instances of which, from injuries of the brain, and also from irritations of the stomach, are convincing proofs; and it is even sometimes supplicated, when the part primarily irritated escapes. But it is apparent from other circumstances, that distant impressions, such as cold applied to the surface of the body, act through the medium of the stomach; and also the affections of the mind, such as anger, increases its secretion; and the depressing passions, lessen this considerably, such as fear, or despondency: from all of which we may collect, that the liver is more easily affected by sympathies than any other part of the body, except the stomach and intestines. And the heart, which is so much affected by the mind, that its motion is very soon depressed or quickened thereby:



from whence we see that those parts which are themselves the most irritable, also the most readily sympathize with other parts. From the frequency of the heart being affected in this manner, it was sometimes thought to be the seat of the mind. The liver is endowed with a great proportion of irritability ; and it was by the anatomical investigation of the functions of this part, that Glisson was led to the discovery of this principle, shortly after the discovery of the circulation of the blood, by his associate Harvey. We have reason to believe that all irritable parts are also very readily affected by sympathy with other parts ; but as both irritation and sympathy, are performed independent of sensation, these properties were, until lately, almost totally neglected, although an universal principal in vegetable, as well as animal life.

Professor Glisson was led to the discovery of the power of irritability in the liver, from the consideration, that the blood was distributed through it, by a vein named from the place of its entrance into the liver, the *vena porta* : a tolerable good idea may be formed of it, by the figures of it in Cheselden's *Anatomy*, which is in the possession of most students. This vein collects the blood from the stomach, intestines, and all the parts contained in the lower belly, and, from thence, carries it to the liver, through every part of which, it is distributed for the secretion of bile from it, by the glandular parts of the liver, and from this the blood is returned to the heart by a branch of the great vein. There is also a small artery goes to the liver, for the purpose of supplying its nutriment, which is always afforded from arterial blood : as also the secretions, this one of the bile alone excepted, which on that account is a singular part of the animal economy. This blood returning directly from the first passages, has been supposed to carry something septic or alkaline from their contents, and from the absorbed fat of the mesentery. This was supposed to constitute the principles of the bile, and to contain some of the properties of soap ; but in order to force the blood forward, through the circulation in other parts, there are a considerable arterial force requi-

sile; but here there could be none, as it is all expended perhaps more completely, than in any other part of the body: by the length and minuteness, of the ramifications of the blood-vessels in the lower belly, which are not equalled in any other part of the body. Glisson was first led to discover another propelling power on this account, and to adopt that of irritability, as an absorbing, and propelling force, without which, the circulation could not be carried on here, as the force of the abdominal muscles must vanish, amongst the number of minute veins, absorbents, and other parts contained in that cavity; and both in his anatomy of the liver, and that of the abdomen, he uses this term, and he is the first in whose works we find it; for what he denominates rational, or mental anatomy, is what has lately been named physiology, or more properly physianthropy. But although the fat of the mesentery is absorbed in the time of sickness, &c. for an absorption is certainly going on, from the contents of the intestines, constantly, as we may prove by the dryness which they acquire by remaining there, and also by the total absorption of enemas; yet since we have found that absorption is not performed by the veins, as was formerly supposed, but by the absorbent extremities of the lymphatics, and by them carried to the thoracic duct. We cannot perceive that any of the absorbed fluid should go to the liver, although the blood conveyed to it is somewhat darker coloured than other venous blood, and may therefore contain more of the unassimilated elements of the bile; but that the fat, and an alcali are carried thither to form a soap, or any thing similar, we are not certain; although from the gall of animals taking the stains out of clothes, it would appear to prove some similarity of its properties to those of soap, although the analysis does not detect it, &c.

In weakly and phlegmatic habits, and in cholorosis and hypochondriacs, the bile was always found of a pale colour, and watery consistency, by Morgagni; but in the robust and active, it has been found to be of a concentrated and strong consistence; and in animals which have died of hunger, it has been found to fill the gall bladder,

and sometimes to make its way into the stomach, as in vomiting, from emetics or sea sickness. The bile is apparently forced into the stomach by the muscular action; and when there, it always causes an uneasiness. Hoffman and Baglivi thought the bile resembled the extract of bitter herbs, particularly that of wormwood and centaury, and from this imaginary similarity, has probably arisen the esteem these vegetables have on some occasions been held in, where there was no deficiency of bile; although so seldom applied where it is defective. Sir William Fordyce thought that the liver, and the bile was of the first consequence in the animal economy, and that we could learn more from it, than from the pulse, the tongue, or all the excretions together. It is certainly a very good index of the state of the neighbouring parts; but he thought it was the stimulus to all their functions, both healthy, and morbid; and consequently that its degeneracy was the source of almost every disease.

All the interior cavities and tubes of the human body, are defended from the acrimony of their contents, by a membraneous lining, which is furnished with organs, either glands or capillaries, which secrete a mucuous lining, to defend them from their contents, or from the action of the air; this is the part which the moderns have denominated the mucous membrane; but when this membrane is irritated, whether by getting cold, or by infection, its action is increased, as in the interior part of the nose, and the branches of the windpipe, or in the urethra, from morbid stimuli, and in the intestines in the dysentery: the secretion is thereby increased, and becomes of a thinner consistence, unfit to defend the parts from the acrimony of their contents. From whence follow pains, with catarrhal, or mucous discharges, mixed with their contents, which, together with their increased action, invites a greater than ordinary influx of blood to the inflamed surface; so that one means of irritation increases others, as we see in dysenteries, until the susceptibility is worn off, and the liver always shares in the affections of these parts; and after the inflammatory state is past, a weakness remains which is a cause of the conti-

nuance of the increased excretion, in the chronic diseases of these parts. This appears to be the state in which they are ; for it appears that chronic weaknesses of the liver, and consequent stagnation of its fluids, may take place without any preceding suppuration, or other inflammation, than that of the mucous membrane ; whereby the energy is diminished, and stagnations and obstructions with an enlargement take place, sometimes with or without extravasation, and putrefaction of the fluids. But stagnant fluids have always a tendency to putrefaction : this is the apparent state in which the liver is in cases of torpid enlargement, &c. For when the hepatic vessels are in a lax, or paralytic state, the bile will not be secreted in large quantities, and the intestines will labour under a deficiency of their usual stimuli ; and their motions will be diminished, and costiveness will ensue, with a weakness, and hypochondriac disposition, accompanied with indigestion, and crudities in the first passages. In order to obviate this state, exercise in the open air, such as walking or riding, increased by degrees, is very advantageous ; so as to promote the healthy actions of the solids, and consequently the secretion of healthy fluids. This state of the system may be illustrated, by a species of inflammation which takes place in the eyes, wherein the vessels are so relaxed, that the red particles of blood enters them, which may at first be cured by cold water, but which emollients, or relaxents increases, merely by relaxing the vessels, and by this means inviting more fluids into them.

In the relaxed state of the liver, even the quantity of bile which is secreted is of a thin, watery consistence, and will not therefore perform its due functions, and this must also be a passive cause of diseases. There are sufficient reasons to believe that the slow, insensible abscesses which sometimes take place in the liver, are produced in a manner similar to this, and that the treatment, by mild stimulants, is in some measure analogous to this. Obstructions of the liver and spleen, are common in many damp, marshy situations, where inflammations, or abscesses rarely ever happen : for these last affections



are most common in very dry, warm, and otherwise heathy places; but obstructions are very apt to follow the abuse, or premature use of the Bark, or those in whom intermittents are altogether neglected. The abuse of bark in young and strong persons, may cause scirrhus swellings, and the neglect of the disease causes weakness; whereby the parts are unable to propel their fluids, which therefore stagnate. By reason of the weakness, following the increased action, and in the torpid state of the liver, obstructions and tumour will evidently take place, from the defect of vital energy, in the smaller vessels of the part: but that which follows inflammation, or increased action, is considerably different from that caused originally by a torpor of these parts; for these affections are sometimes of a scirrhus nature, and very obstinate in yielding to medicines; but the torpid swelling is easier overcome by gentle stimulants, exercise and cordial nourishments. But a scirrhus affection, is more intricate in its nature, and difficult of cure. A mere torpor of the part is an affection of all others the most simple in its nature, and treatment, for it appears to be only a defect of stimuli, or of exertion in proportion to the strength.

A scirrhus is, so far as we know, always preceded by inflammation; during which the vital energy is much exhausted in the parts wherein it takes place; by the excess of the inflammatory action, after which so soon as the inflammation is over, the parts are left in a state so weak, as not to be able to propel their fluids, which of consequence stagnates. Whilst some absorption of the thinner fluids are going on, the part becomes hard and commonly insensible, the absorbents appear to be much concerned in this disease; and it is highly probable that both scirrhus and cancer are formed in their trunks, and only affect other parts through the medium of these vessels; for affections of these are generally very obstinate, as we may learn from simple wounds of their large trunks being generally so difficult of cure; and from their irritation by morbid stimuli, being the most common causes of indurations in those glands, through which they take their course, and the obstinate nature of these

indurations whether caused by syphilitic or other infectious stimuli, are but too well known to most practitioners; and there are no other parts in the composition of glands, not even the nerves themselves, from which we meet so much obstinacy in the cure.

Sudden changes in the weather, but especially, a cold night air, after very hot weather, frequently produce obstructions, and even extravasations, and in the robust, it may cause inflammation, and suppuration. These often take place, after violent heats, and when the changes of the air are sudden, the chill of the cold immediately affects the parts, such as sitting in a stream of air, when very warm, and by this means cooling suddenly, and after the use of spirituous liquors, these affections, are more deleterious. From this we learn the propriety of bringing about all changes slowly, for it is the suddenness of the change, which is the cause of the disease; for much greater extremes of either heat or cold, may be borne without injury, if applied cautiously, and neither of the extremes suffered too soon to follow the other; for cooling suddenly, after being heated by exercise or otherwise, is much more dangerous than the heat itself, whilst it continued. For in general, the greatest danger to be apprehended from heat, depends on the mode of cooling; for it often causes obstructions, or inflammations in any part; but of all the viscera, there are none more apt to be affected in this manner than the liver, and spleen: and from attention to what has been already said, we may understand the mode of action, by which this is produced, thus when heat, liquors, or other stimuli are used, they cause violent action of the parts, which must exhaust their strength, and if these stimuli are suddenly discontinued, before the parts recover their energy, stagnations ensue.

As the difference in the causes and nature of hepatic diseases are various, so also are their physical natures; those obstructions which succeed autumnal fevers, which so frequently cause dropical and jaundiced appearances, are extremely different from those acute inflammations, which follow exposure to great heats in the day time, with the additional stimulus of spirituous liquors, succeeded by exposure to a cold night air or to rain—the first will

readily be understood to be of a torpid nature, not causing much uneasiness, nor swelling, and more readily perceived by its effects, than by any immediate appearances of the parts originally affected: unless by a sensation of weight, especially from the jolting motion of a carriage, running, or leaping, or by a numbness towards morning, after lying on the right side in the night; but the dull appearance of the eyes, the swelling, and pitting of the ancles towards evening, if the patient keeps up in the day, indicates it plainly in these distant parts, but this state of the disease, is seldom obstinate. It is but in few cases of the most acute inflammations, in which the pain is very great, but commonly the more rapid it is in its progress, the more sensible it is apt to be perceived, and accompanied with pain; in some instances we have seen it so acute, as to deprive the patient of rest, day and night, and the pain so great as to prevent their lying down, causing a symptomatic fever. One case of this nature was fatal in nine days, but it was the most acute we have ever seen or heard of: it happened in a plethoric young man, who was our captain's cook, and had never been in any warm climate before that voyage.

Affections of the liver are in some cases so obscure, as to be extremely difficult to discover; these are the chronic cases which make their attack, and advance very slowly, and almost imperceptibly; causing very little uneasiness at first, and are most frequently discovered in the course of time, by some secondary consequences, such as pain in the back part, commonly of the right, but sometimes it is in the left shoulder; here the cause of the sympathy, although long observed, is very difficult to be traced, for we know of no similarity of structure, nor nervous communication between the parts; nor is there any continuity of membraneous substances; but these symptoms are not always present in this disease; the tickling cough, and shooting pains up the breast, are more easily traced from the ligamentous, or membraneous connexion of the liver, with the diaphragm, (or midriff) and its connexion with the pleura, and mediastinum.

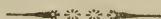
In many cases of diseased liver, the affection cannot be discovered by any external appearance of bile: in some chro-

nic cases of long standing, the patients are even whiter than common, but the appearance of the whiteness is different from that of health, it is rather a dead white, accompanied with a dullness of the eyes; the vivid sprightliness of which, so characteristic of health, and animation, and the ruddy colour of the skin, being destroyed by the disease—neither are there an appearance of bile, either in faeces, or urine; here it is probable that the secretion is not performed: this state is most common to those who have laboured long under the disease, and are weakened by it. Those who are in this state, have little or no appetite for food, are frequently feverish, especially in the evenings, and are often harrassed with lowness of spirits, rather inclining to melancholy, they are readily affected by every slight impression, and even their imaginations often affect them more than real physical causes would in health.

The obstructions it is most probable, take place in the small branches of the porta, which carries the blood to the liver, from the other parts of the lower belly, as the resistance to its action must be far the greatest, in proportion to the impelling power with which it is endowed, of any vessel in the body. But it would appear most probable, that although chronic obstructions, are owing to this cause; this vein performing the offices of an artery, propelling the blood through the glandulous part of the liver, from which the secretion is made; for we have great reason to believe that the artery, of the liver, which supplies its substance with nourishment from the blood, is from its smallness, not adapted to supply the secretion of bile, which in a healthy state is a large quantity. This artery is certainly active in the acute inflammations of this part; for like other acute inflammations, a pulsation or throbbing may be perceived by the patient. From the acuteness of the pain we are certain that the nerves are affected, and most probably the artery; on consideration that this state of the disease, is very similar, both in its symptoms, and treatment, to other cases of glandular inflammations. We have no doubt that it may partake of a phlogistic, or of an erysipelatous nature; but we believe



that they vary considerably in different habits of body—in the young, strong, and full bodied, we believe it often inclines to true, and in the weak to an erysipellatous nature, the parts being vascular.



*Of the Varieties of Diseases of the Liver.*



**I**T may now be perceived that there are two distinct varieties of hepatic diseases; very different both in their natures and treatments, and unless we keep this division in view, together with that of many intermediate shades between them, our ideas of the nature of the affections of the liver, and of the modes of treatment, must be confused and erroneous.

Of the nature of the affection, we may form a judgment from the modes of the attack, and the present symptoms; but in this disease the acute state, does not always necessarily precede the chronic. For this last variety of the disease often begins, and goes on in a gradual, and often an imperceptible manner; and is at length discovered by some secondary affection, such as a tumefaction of the feet, a dullness of the eyes, a pain in the back part of either shoulder, or sometimes a shooting pain up the breast, a tickling cough, and a dull weight in the hypochondrium seldom accompanied with pain, although often with oppression, or a languishing sensation, with a melancholy turn of mind, or hypochondriac disposition. From this it is very evident, that there are some considerable differences in the disease, when preceded by inflammation, and when it is not; for when inflammation has preceded, there may be either a small quantity of matter

formed, or a scirrhus swelling, or a hardness may remain a long time, without causing much uneasiness, and may be carried off by moderate living, exercise in the open air, cheerful company : and pills occasionally, with agreeable amusements, are remarkably salutary.

When the superior and convex part of the liver, about the suspensory ligaments is affected, the pain is commonly very acute, for although ligaments, and membranes are insensible when in health, they are acutely sensible in a diseased state ; this variety of the disease is most apt to attack the strong and plethoric, and in them it is accompanied with all the appearances of a truly inflammatory disposition, and here blood-letting, the neutral salts, and diluents, are requisite : this state is most apt to take place in the natives of temperate climates when they remove to warm countries, particularly in those who use spiritous liquors freely, and expose themselves to the heat of the weather, or use strong exercise ; and cool themselves suddenly, by cold drinks, or exposure by sitting in the cool air, in the shade, or at night ; all of which are dangerous in many respects. But while walking, cold air is not hurtful, but cooling suddenly after being very warm, is a dangerous process in any climate, but doubly so under these circumstances.

The opposite appearance of this disease, which takes place slowly in melancholy and weak constitutions, after being much exposed to a warm atmosphere, is properly named the chronic hepatitis, in this state it is not uncommon for the substance of the liver to become scirrhus—patients in this state are frequently Hypochondriac, and as the secretion of bile is deficient, they are always in a costive habit. A sedentary life, with much anxiety of mind, appears often to be an occasion of this variety of the disease ; but a state similar to this often occurs, without any very obstinate disease of the liver, merely from confinement, and anxiety ; but this affection may be relieved by exercise in the open air ; country living, cheerful company, and amusement ; those who have been used to a country life, exercise, and air, on being confined to business in large towns, commonly fall into this state,

in any climate ; and may be recovered, by indulgence in their former modes of life occasionally ; being obliged to take journies or voyages on business, answers peculiarly well, in this situation ; and stimulant saponaceous ; but gentle laxatives once or twice a week, with an infusion of columbo-root, but an habitual use of them is to be avoided ; therefore, they should not be used oftener than necessity indicates.

Chlorosis in young females, is nearly allied to these affections, for in them, as well as in the hypochondriac, we may find by Morgan's dissections, there was always a deficiency of bile, and it was pale coloured and watery. And the same observation has been made by others, particularly by Kirkland, who found the liver of a very small size, and pale coloured, in a hypochondriac patient, and it was found in the same state in all weak and delicate persons. Where the colour is pale, or a dead white, there appears to be a deficiency of the vital energy in this viscus.

All cases of acute, or rapid diseases of the liver, are not necessarily attended with great pain : for they are often rapid in their progress, and suppuration far advanced, before they cause much alarm ; and in other cases, where the progress is not much more rapid, the pain will be extremely acute. Much depends on the seat of the inflammation, whether it is in the parenchymatous substance of the liver, or near its vascular or nervous parts ; for the more rapid it is in its progress, the more readily it causes pain. But from the symptoms already taken notice of, as they are to be met with in practice, and other phenomena which shall be taken notice of hereafter—we shall endeavour to render the physical state, and nature of the disease, as intelligible as language is capable of ; but we must not forget that language comes far short of all our mental stores, &c.

The apparent cause of the greatest pain in this disease is to be found in the seat of the affection. When the vicinity of the suspensory ligament is the seat of the disease, the pain is commonly most acute, and when the extreme parts of either of the lobes are affected, the pain appears to be the least ; and so in proportion to its distance from the large vessels, and nerves, the capsule of

Glisson, so named from his discovery of it, which envelopes the vessels, we have every reason to believe is very sensible when diseased; and it is probable from analogy that it is only in the diseased state, that either the ligaments, vessels, or membranes, are endowed with sensibility. For this is the case with the ligaments, and membranes and many other parts in the body, they are only sensible when morbidly affected. This is the manner in which the disputes, arose with Haller, who denied, as he was authorised by his experiments, that either tendons, ligaments, or membranes, were sensible. Whereas it had been often found by others, that in the diseased state, they were extremely sensible, but it is a circumstance universally experienced, in the practice of the healing art, that the susceptibility of sensation and irritation, is increased by diseases.

But the substance of the liver, as well as that of the lungs, is capable of two varieties of obstruction and supuration, that is when either one or more large impostumes, formed in different parts of their substance; or to innumerable small grains, of the size of pepper corns or large grains of shot, named tubercles, each containing a small quantity of pus; both of these we have seen repeatedly on dissection, both in the liver and lungs, the pain appears to be much increased by the resistance to its enlargement, which it meets with in the inflamed part; hence the great pain of whitloes and other parts confined by ligaments. The seat of the inflammation when near the suspensory ligaments of the liver, we have found, on dissection, in some of the most violent cases we have ever met with. But the formation of tubercles is commonly attended with little or no pain of the part, or these symptomatic pains of the shoulders, or breast, which we have seen so commonly in other cases of hepatitis. But with a jaundiced appearance very obstinate, sometimes resisting all medical treatment, accompanied with a hectic heat; a quick and small pulse, with great thirst and feverishness, but the hectic pulse and fever, is common in cases of abscesses here, the jaundiced appearance is not so common, although it often happens, &c.



These affections of the liver, brought on by the depressing passions of the mind, as by grief, and despondency, are rather of the chronic, than of the acute species; this affection takes its name of melancholy from the appearance of the bile, which in this state is generally of a dark colour. The Ancient Grecians thought the bile here, was the cause of the disease—but although that doctrine has lost its force: yet we may collect many useful indications from its appearance; and in this light, it is still an object of considerable importance. The circulation in the liver becoming languid by grief, and other depressing passions, and the porta wanting the assistance of arterial force to perform its very laborious functions; and its energy depressed by the passions themselves, and the blood accumulated in the branches of the porta, causes a painful and obtuse sense of oppression, anxiety, or despair—and very often compleat mental derangement. And although it may not often be suspected, yet it is a certain fact, that the liver is far more frequently the seat of mania, and of melancholy, than the brain. For although this part may, in some cases be primarily affected; yet we believe it is extremely seldom so—these slight alterations which have been found in the brains of maniacs, on dissection, by Morgagni, and others; such as a dryness, and hardness of the substance of the brain, are as probably the consequences, as causes of these affections—but the oppression in the hypochondria, the langour, and anxiety, &c. and the methods of cure, which are most successful, points out the liver to be the seat of the disease.

*The treatment of the acute Hepatitis or Inflamed Liver.*

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THIS affection, being so various in its nature, and in the manner of its production, must often require very different modes of treatment; but as the acute state of the disease, requires speedy assistance, we shall begin with it; and proceed to the Chronic. Here we are to consider that it is an inflamed gland we have to treat, and one whose sensations, and functions are very obscure. In this state of the disease we have seen the fatal effects, of an empirical practice in its most glaring colors, and of those extravagancies which a random practice often introduces, not only in the present affection, but in many similar instances. The most simple diseases, of the least complex glands, are generally very obstinate of cure; but it is probable there are none more so, than that under consideration; but this is no apology for treating it in an empirical and irrational manner, whether the disease is only in its incipient stages, or of long standing. It is a misfortune but over common with a certain class of medical practitioners, when they find out, or even hear of a remedy, or mode of treatment useful in any disease, to apply it to all stages and varieties of affections which bear the same names, setting both science and reason at defiance. The fatal effects of such proceeding have been but too often experienced in the present affection. In the acute hepatitis, every thing is to be avoided which has any tendency to produce irritation, or to increase the inflammation, consequently all stimulants, of whatever nature they are, must be avoided; and on the contrary, every circumstance of regimen, and medicines which are of a sedative, or cooling nature, are to be had recourse to, and persever-

ed in so long as this stage continues. Here bloodletting, and neutral salts, or castor oil, and antimonials will come into use, in the first stage of the disease. Where the pulse is full and hard, bloodletting should be practised at the beginning; but here we shall observe that it is only those who are in the habit of paying strict attention to the pulse, who can determine the necessity of this operation, in any case. It may on some occasions be necessary to repeat it three or four times: and in order to carry off any stimulant matters, which may be lodge in the first passages, rochel, or common salts, or castor oil, may be given every second day, and at night a moderate dose, as about fifteen or twenty drops of antimonial wine, or four or five grains of antimonial powder, drinking some warm diluent fluid, at the same time, in order to promote a perspiration. This course may be persisted in for some days, provided the patient be young, and strong, and his external appearance shews signs of an inflammatory disposition, such as a flushed, reddish or puffed up countenance, a pain, or sense of straitness in the orbits of the eyes, &c. and by pursuing these steps in the early stages of the disease, we may prevent the formation of matter, and this is an object of the greatest magnitude which we can attend to at this time.

The internal use of nitre in doses of twenty or thirty grains has been in high repute here, as well as in inflammations of the lungs: it may be given in syrup, or molasses, and by its property of lessening vascular action, we are inclined to believe it is very useful, in all cases where we would wish to prevent the formation of matter.

The exhibition of antimonial medicines, should be cautiously managed, lest they promote a vomiting; a circumstance which we should generally wish to avoid, in acute diseases of the liver, on account of the compression, and concussion which the operation produces.

Indulging in rest, particularly in bed, and endeavouring to support a moisture of the skin, by warm bathing of the lower extremities, and small doses, such as three or four grains of the antimonial powder, will answer well to be taken at night, avoiding sudden cold, or any agitation

either of mind, or body, for either may be a means of causing rigors, and strictures of the skin, which are both attendants, and causes of suppuration. A true phlogistic inflammation of the liver; was said by some men great in medical science to be a very rare occurrence, but we have much reason to think otherwise, for if the formation of matter can be taken for a test of phlegmon, it may be found here very often.

Ideas of malignity, and obscurity in this disease being removed, as far in our power, it will appear that when we make allowance for the complication, of the organ affected, which is one of the most complicated, and irritable glands in the human body: consequently its diseases must also be complex, and often more obstinate than those of other parts; so that perseverance and patience here are both requisite. But the plan we have pointed out, must be pursued, with occasional variations whilst the acute state continues. But as there are great varieties in the degrees of acuteness, so there must be in the modes of treatment; for although matter is often formed in great quantities, in acute inflammations of this part: yet they appear often to partake of an erysipelatous nature, especially if we were to judge by the length of time it continues: as phlegmon in the opinion of some eminent physicians, never continues so long. Dr. Fordyce limits it to three days in general. It will readily be understood that when the disease is of an erysipelatous nature, there will be more of an erythematic disposition, a quicker and smaller pulse; for here the membranous parts are more affected, than in true inflammation, and the treatment must be suited to it: but this will be better understood, from what is already said, on erysipelas, this being generally an affection of the membranes it is more tedious of cure, and in weakly, and aged persons, it may in its latter stages, require a nourishing, cordial regimen, together with opiates, and the Peruvian bark, after the first irritation is removed.

It may be thought by some of our readers, that we are unacquainted with the use of mercurials in this disease, but it has happened, that we are but too well acquainted with their



effects in acute hepatitis. Mercurials were about twenty years past, in their meridian fame in those parts of India, where this disease is most prevalent, and from some late publications, they appear to be so yet, with some practitioners there. But we hope, from our acquaintance with their pernicious effects, that they are not so with them all; for many of them, we are very certain, have minds formed so as to profit by experience.

It is within the last fifty years, that the use of mercurials were first discovered in India, for the diseases of the liver. But it happened unfortunately, that the discoverers recommended it indiscriminately, in all hepatic affections; and they were as indiscriminately followed by others, who were happy to learn an easy, and expeditious mode of cure, for a very obstinate disease; this has been the case with most discoveries in medicine. But this mode of practice, was for some time in partial use in India, before it was published in Europe. But as soon as it was made known there, it must of course share the same fate with most other discoveries, of being over rated at first—Therefore young practitioners going to India, strangers to the climate and to its diseases, a general mode of cure, which appeared to supersede the necessity of thought, in a climate where every thing conspires to produce indolence and luxury. Therefore this mode of practice soon became general, both on land, and at sea; for in this employ there are none of those mean jealousies, so pernicious to science in other parts. But this freedom of observation is not intended to hurt the feelings of any one individual; we have fallen into the same error, and it is from experience of its pernicious effects, that we have seen the necessity of learning from fatal experience, the propriety of departing from the beaten path—and we are happy, that for about fourteen years we have followed, and recommended a more successful mode of practice in India—and also in America, where this disease is also much more frequent, than it was formerly suspected to be. For it was formerly the custom in most countries where this disease appeared; as it often does in Europe, as well as in other parts of the world, to refer it to that class of diseases which its exter-

nal appearance most resembled. Hence when a yellowness appeared in the eyes, it was called a jaundice; and when the appearance of dropfical swellings took place, it was denominated a dropfy; and these being names long sanctioned by authority, often satisfied the physicians, as well as the patients, and their connexions; especially those who have an aversion to dissections. And when persons were low spirited, hypochondriac, or melancholy, as they frequently are, when the liver is diseased; it was supposed to be a disease of the mind; and consequently the brain, and nerves were supposed, to be the chief seat of the mental derangement, although this is very seldom the case, if we will put any faith in Morgagni dissections; and pay any attention to the modes of treatment which most commonly succeed in these cases, and their appearances after death. But the abuses of mercury in cases of acute hepatitis, or in any stage of it when attended with acute pain, we know to be the most pernicious mode of treatment, which it is possible to invent: for it will scarce ever fail of promoting the formation of matter; the great object which we should wish to avoid. For if the formation of matter can be avoided, we may confidently hope for a cure; but when an abscess, or even tubercles are completely formed, a complete cure is very doubtful; although even in this case, we are not by any means to despair of a cure, and if not a complete, at least a partial one.—The confounding of acute, with chronic; and of phlegmonic, with erysipellatous inflammations, have been the cause of much unsuccessful practice in medicine; and perhaps in no one part of it, more than in the diseases of the liver. This subject is of a nature so important, as to merit the most serious attention of every physician—but more particularly of those who practice in warm climates. But the efficacy of mercury being discovered in chronic diseases of the liver, and it being indiscriminately recommended, it soon got into general use, in both states—from its advantages in the chronic. And the acute were set down as incurable, when the patients died, as they generally did under this treatment—my first India voyage afforded many instances of this. But the mischief

did not end here, for its application was transferred to, and recommended in other inflammations ; and as it was on some occasions useful, or perhaps only harmless in erythematic inflammations—it was also applied in the true phlogistic cases of inflammation.

But it happened to us in the early part of our practice, whilst mercury was considered a specific, in all the stages and varieties of the disease, there were seldom much time lost, until it was had recourse to it ; although even then, bleeding and a dose or two of salts were common—but this was a course of preparation much too short, for a very obstinate disease ; for the inflammation is often so very tedious, as to continue for weeks together, not much diminished—most probably this is by communicating from one part of the liver to another : as it sometimes happens to other glands, that the inflammation often continues long in its full force ; but we can safely pronounce mercury to be highly pernicious, in the first stages of the disease, whilst the pain, or true inflammation is present—for tubercles, or impostumes are so apt to follow, that it is scarce possible to avoid them ; a circumstance which should be dreaded, above all others. These are the effects which we have seen invariably take place from the abuse of mercury, in the early stages of the disease ; so that we are not more certainly convinced of the poisonous effects of arsenic, than those of mercurials, given in the acute stages of this disease. Were we to collect cases in proof of this doctrine, we could multiply them to a very great extent, on both sides of the Atlantic : and even where this disease, until lately, was not supposed often to happen ; as well as in India, where it is very common, from the heat of the weather, the abuse of strong liquors, and the coolness to which strangers commonly expose themselves in the night air, after the great heats of the day. But one or two cases may be necessary in order to exemplify our mode of treatment.

The following is the case of a young man never in any warm climate before, he was remarkably plethoric, aged about 25 ; it is remarkable that although this case was as acute perhaps, as ever was observed, and also as painful,

yet the pain was not increased by pressure, which might have been owing to its being rather under the short ribs—at first it appeared as much like a dysentery as a hepatitis.

The case of John Frodsham, captain's cook, of the Royal Charlotte, when lying in the Basin at Rat Island, off Bencoolen, in Sumatra, in November 1784. We may observe that it was possible the predisposing cause of this disease, was contracted at Madras, from which we had sailed the 8th of the preceding month. For when on shore there, he had a diarrhea, which was easily cured; the weather during the interval was cloudy and rainy, with frequent storms, and when the sun appeared through the clouds, it was excessive warm. He was attacked on the 15th with a severe pain in the right hypochondrium, with purging, and a griping pain of his bowels, head-ach, and giddiness, with a quick, but small pulse, for which he had an antimonial every four hours, with Barley water, for his common drink—16th, the symptoms were all worse; the antimonial vomited him; he had a dose of salts, and a calomel pill at night—17th, he complained of acute pain under the breast bone, on a full inspiration; pulse full and quick, near a pound of blood was taken from his arm; and a small anodyne, in order to alleviate the pain at night—18th, the same, he rested in the night, and continued the medicine—19th, feverish with a sick stomach; he continued the same medicines until the 20th, when he complained of great pain, in the region of the liver, with difficulty of breathing—the bleeding was repeated, and a blister was applied over the part; the medicines were continued until the 24th, when he was removed on shore, where he died on the 9th of December, the pain continuing violent, although several cooling sedatives were tried. On opening the body, the right lobe of the liver was found much enlarged, and adhered to the side, and when cut into, about two pounds of matter started out; the gall bladder was full of bile, and no other morbid appearances were observed.

Since this work went to the press, a case of hepatitis more acute than common has occurred to us in a gentle-



man, aged about 40 years, who leads a sedentary life. During the sudden cold weather towards the end of September, he supposed he must have been hurt by writing in an office without a fire, and early in October, he was taken with a slight remittent fever, in which he turned yellow about the third day, but he was scarcely confined to bed by it, the seventh day: he was so far recovered by the proper remedies, as to begin to take bark, of which we believe he took more than was necessary. He was one week clear of the fever, when taken with a pain which he described to have begun in the lower part of his bowels, and settled in his stomach, which was easily relieved. Next evening the pain returned with greater violence, and at going to rest he had an anodyne which gave no relief, and being called up at two in the morning, before my arrival with the patient, he had vomited. And still complaining of the pain in his stomach, on which a gentle emetic was exhibited, as we supposed there was something noxious in his stomach, this operated three times without any relief. On which suspecting he had mistaken the seat of the pain, on applying my hand to the pit of the stomach, he complained of a violent pain on touching the right side of it, which was supposed to be over the gall-bladder, and there the pain was now concentrated. A biliary concretion was now suspected to be passing the duct, and the pain was so violent, that a small anodyne was given, which together with the former fatigue procured him some rest: and next morning, being the third, he had an ounce of castor oil, the pain appeared to move round the right side under the short ribs, the real nature of the disease was now soon discovered; he was bled, and took warm diluting drinks, and small doses of antimonial powder, and on the fourth day of the disease, about twenty-ounces of blood was taken from him, and he went on with the diluents and antimonials, and a blister was applied to the part—on the fifth he was the same; this day Dr. Wistar was consulted—he was perfectly convinced of the nature of the disease, and of the propriety of the treatment. Every second day he required an ounce of Rochel salts, or castor oil, to preserve his bowels open, with pills compo-

fed of venice soap and the gum pills, in each of which there were a third of a grain of tartarized antimony, two a day, he was now bled a third time and went on in the antiphlogistic plan. And the seventh he was again bled, the pain and quickness of pulse still the same, with some small variations, the blood which before this was dark coloured, was now very thin, or watery; the eighth day the pain was a little abated, and he had pills composed of the triturated mercury and soap, of each two grains, with the tarturised antimony—the eighth he had one, the ninth two, the tenth three, and the eleventh four; two of them kept his bowels open, but three or four purged him, and the matter evacuated, had every appearance of pus, which gave us hopes that it was passing off by the biliary ducts, and this we believe was the case. For he had no more accute pain, but the lax continued three or four days with a griping, during which the antimonial was omitted in the pills; of which he only took two each day, he recovered gradually, and on the fifteenth was able to sit up. He had an infusion of columbo root on the thirteenth, as he was very much reduced, two drams to a pint of water, to restore his appetite; of this he took one half in the morning, the other at noon, with the pills until he was tolerably well restored to his appetite—the violence of the pain was such that he could not move in bed, he was obliged to lie constantly on his back; but it was less violent when he inclined to the right side than to the left. Although he felt a severe pain from pressure on the part; there was no hardness to be perceived, and he is at this time in a tolerable good state of health, but still rather weak—it is now twenty five days since the beginning of the disease, and ten since his being able to sit up. Dr. Wistar who attended daily for a week, can bear witness to the severity of the disease, and the method of treatment which was pursued, as he knew it all from the beginning to the end.

*The Treatment of Chronic Hepatitis.*

IF the disease comes on slowly, or when a hardness or other appearances of chronic obstructions remain, after the acute stage of the disease is over, then we may consider the affection to be more of a chronic nature than in the preceding state, and the mode of treatment must be regulated accordingly.

This state is sometimes discovered by a pain in the back part of the right or left shoulder, and sometimes a pain extending up the breast, accompanied with a tickling cough. On applying a hand to the part, rather under than below the short ribs, a tumour may sometimes be perceived by the hand; but more commonly it may be discovered by a pain felt by the patient on pressure; when instead of one or more large tumours, there are tubercles, disseminated through the substance of the liver; they cannot be felt by the hand through such deep coverings. When the fore part of the liver is indurated, or swelled, it may be perceived; but when the back part is affected, it is scarcely to be felt by the hand. The wax-like hue of the skin, or defect of the ruddy colour, and lively appearance of the eyes, when they assume an inanimate appearance, and the dead white of the skin, often with yellowish or brownish tinge, are strong indications of this disease. Sudden motion, as leaping, running, or riding, may discover it when it is very obscure, but in the acute stages, they are not practicable; although we believe they seldom cause the abscess to burst, which is mentioned by Morgagni.

Here stimulant purgatives may be more useful, pills composed of mercurials and Venice soap, with some other active cathartics, as scammony, gamboge, &c. may be taken occasionally, before going to rest: these pills keep the

bowels open, and by adding a third or fourth of a grain of emetic tartar to each, they promote a perspiration in the night. They also give a little stimulus to the absorbents, when they are in a torpid state; at the same time an infusion of columbo may be used early in the morning, and an hour or two before dinner, in order to promote the digestion, which in this situation is very apt to be languid, and weak. Any other bitters which may be relished by the patient, provided they do not cause costiveness, may be used. The juice of dandelion if convenient, may be had recourse to occasionally; and also the expressed juices or decoctions of other gently stimulant vegetables. Water cresses are also accounted useful; and other acalescent, or pungent vegetables used, as salads. The food should be easy of digestion, such as veal, lamb, or fresh beef, or fowl. Pork, especially if salt, or ham, should be refrained from, as they are difficult of digestion. This course may be persisted in for two or three weeks, and then either left off for a week, or changed in case no advantage appears to be gained by it: the same or a course somewhat similar, may be again had recourse to, instead of the aloes, which is itself, if not combined with the soap and tartar emetic, apt to cause a costiveness; two grains of scammony, or gamboge may be substituted in the pills; for different constitutions, as well as the states of the disease are so various, that one form of medicines cannot be expected to succeed in many cases. The torpid and phlegmatic, will require stimulants, such as the foregoing; but the irritable and weakly, require medicines of a more sedative nature, such as the neutral salts, once or twice a week, and pills composed of soap and scammony of each two grains, and from one half to a third of a grain of the tartar emetic, &c. These formulas, and others of a similar nature, may often totally supercede the use of mercurials advantageously, in cases where they are improper, for they are by no means universally admissible, even in the chronic hepatitis; and we can from actual experience recommend the foregoing mode of treatment as efficacious, having overcome some confirmed cases in this way.



It was in this state of the hepatitis, that mercury gained all its fame ; and also in chronic dysentery, although it has been unfortunately transferred to both stages, and to all states of that, as well as of this disease. But even here, and in those cases in which it answers the best, it is never to be used in that empirical manner, which many practitioners both practise and recommend : we would wish such only to remember that it is the human body they have to deal with, and to pay some attention to the physical natures, and the effects of medicines, but particularly of mercurials ; and not to use this powerful article in a manner of which any rational practitioner should be ashamed. Instead then of the enormous doses of calomel, of which we so often read and hear, our medium dose has never exceeded one grain, and often not so much ; and the extreme dose three grains to an adult, in the twenty-four hours ; and in these quantities, we are sufficiently persuaded, every thing may be accomplished, of which mercury is capable, in the most enormous doses ; and often much more than can be done by large doses, in any mode, or way of managing it ; for it is not an article that produces all its effects by the first impression, unless as a cathartic, however strong it may be. But by a continued use it changes the actions of the solids, principally by stimulating them to new actions, and opposing the morbid actions, &c. Calomel may be united with emetic tartar, and made into pills, with any substance of a proper consistence for this purpose ; purgatives have been commonly added, such as aloes, scammony, gamboge, or jalap, and venice soap, in order to bring them to a proper consistence : the soap has been preferred with a view to supply the place of the deficient bile, as in some cases, when they are of very long standing, and the strength much exhausted ; but of these and similar ingredients, every one may compound pills adapted to the disease. It is to be observed here, that the articles mentioned, are all, except the emetic tartar, and soap, of a stimulant nature ; these may be used here in the chronic stages of the complaint, as they answer to be made into pills, on account of the smallness of the quantity which serves for a dose ; and as they

are to be continued for some time, this is of some importance.

We have known some instances where mercury was used in the profuse antiquated manner, so as to produce a salivation, soon end in death: for this mineral is now believed by many, to be a specific in this disease, and consequently, every one who has paid any attention to medicine, has read or heard of its efficacy in the hepatitis; so that the indiscriminate use of it, is common every where, and in all the states, and stages of the disease. Instead of calomel, the mercurius dulcis, prepared in the humid way, according to Schele's method, is the best of the saline preparations; it being precipitated from a fluid, and not sublimed in the dry way, as the common calomel is prepared: it is much milder than that, and should on this account be preferred in this disease: we have either used this or the blue pills, which is a still milder preparation, these twelve years past. The common quicksilver pills may be given, one or two at night, and if they are wished to be more active purgatives, one half grain of elaterium, or one grain of scammony or gamboge, may be added to each, particularly if there are any dropical collections of water present. It would be a considerable improvement if the extinguished quicksilver was substituted, in the place of the more acrid preparations of mercury, in many other cases as well as this, where we would wish to avoid the formation of matter especially; and at the same time to promote the absorption of extravasated fluids. But in this disease, we have experienced this preparation to be peculiarly useful; and where there may be any doubt of active inflammation, or scirrhus having preceded, this is by far the most successful of the mercurials, as it is not possessed of those pernicious properties, which the more virulent preparations are.

In weakly and delicate habits in particular, this mild preparation answers well; for there are many who cannot bear it in any other form besides this alone. The destructive effects which we have seen in the early parts of our practice in warm climates, has acted as a warning against the free use of mercurials ever since. We lost

about one twentieth part of our ship's company by this disease alone ; and our books which are deposited at the India-House will bear witness, that it was not through a want of mercurials that they died, as it was then in great esteem, and used almost indiscriminately in this disease ; unfortunately they got but too much of it. And as we dissected them all after death, the liver was found in various stages of suppuration ; in most of them there were large collections of matter, mostly of a serous appearance, or a brownish yellow, or a reddish colour : in one, the midriff was corroded through, all to a thin membrane next to the lungs ; in others, the substance of the liver was scirrhus, intermixed with small tubercles full of matter ; in some there were two or three pounds of matter contained in the substance of the liver ; and in others there were various appearances. But always the matter had a thin acrid appearance, and the edges of the ulcerated part had an uneven, granular, or corroded appearance. We never saw any thing here like what is considered good matter ; for it never was neither found of a thick consistence, or white color ; and from the effects of its contact with the diaphragm, we had no reason to doubt of its corrosive nature, for it would certainly have corroded any other part, with which it might happen to come into contact, as readily as this. So that we cannot wonder that it should often make its way into the cavity of the abdomen, or sometimes into the intestines, when adhesive inflammation is produced ; and at other times through the integuments of the abdomen, as it sometimes does, and give a fair chance for making a successful opening into it. For there are commonly adhesions produced, between the parts most inflamed, and those which come into contact with them.

From attention to these circumstances, it will be readily perceived by the intelligent surgeon, that cutting into the part effected, in order to evacuate the matter, is an operation but seldom practicable with success. It is only admissible where adhesion has taken place ; for if this is not the case, the matter must evidently be constantly escaping into the cavity of the belly, where it will be rather more pernicious than in the liver itself, where it

might have a chance of being evacuated by the biliary ducts; which although they and the blood-vessels are generally closed, or sealed up by the coagulable lymph, and the thickening of their coats produced by the inflammation. Which common process of nature generally forms a coat for the matter of abscesses. But although it may sometimes be a boundary for the matter here, yet it certainly often corrodes its way through it in various directions. Cutting for the abscess is very dangerous in the left lobe of the liver, for here the stomach is sometimes in danger of being wounded.

Moderate exercise in the open air of the country is highly useful in hepatic affections, when they are of a chronic nature, either walking or riding; but in the acute state of the disease, it is neither agreeable or proper to be used. But it is extremely agreeable and useful, in the chronic disease; for there is no medicine can produce such an agreeable flow of spirits without it, as exercise does with the assistance of very few medicines; and the depression of spirits, and hypochondriac disposition, which so commonly attends this disease, requires all such mild and inoffensive means as this to be used; especially when there are a hectic disposition, as very frequently happens in this state of the disease. The advantages of riding and walking in the country air, are long established as very salutary; and on the contrary, confinement in close towns, to sedentary employments, especially one wherein the mind is much engaged, is one of the most unfavourable situations; therefore short voyages to sea, are also useful, but they should not be so long as to be fatiguing, for we would not wish any person to go to India to be cured of this disease.

The matter sometimes makes its way by the biliary ducts, into the intestines, this is the course which we should always wish it to take, for here it may pass off without injuring any of the functions, whereas when any of it gets into the blood, it causes a hectic, as all such matter does when it gets there.

The following case occurred whilst I was last in China, in the Royal-Charlotte, it had an anomalous appearance



at its beginning, for it was difficult to determine whether it would preserve the appearance of a diarrhea, accompanied with feverish symptoms, or turn to a dysentery, or remittent fever, all of which affections, were much more prevalent there at that time, than the hepatitis, of which it, in a few days, assumed all the characteristics. October 27th 1790, John Bayley, seaman, aged 25 years, of a phlegmatic habit, had been some years at sea, but never in India before, he complained of a diarrhea, accompanied with griping pains of his bowels, for this he had an emetic, and at night ten grains of philonium, the next day being the 28th, his former affections were much alleviated, and his principal complaint appeared to be a coldness of his loins, he had five grains of antimonial powder, and about forty drops of spirit of hartshorn in water, and repeated it at going to rest, with fifteen drops of laudanum, and the next day considered himself well enough to leave off taking medicine: 30th he mentioned a sensation of pain in his right shoulder; but as his feverishness was much lessened, he had only a dose of sal guberi, and made no more complaint until Nov. 3d. when he complained of a pain of the right hypocondrium, and of the shoulder of the same side, accompanied with a quick pulse; he had an ounce of salts to take at once, and an antimonial powder for the evening, with directions to use warm diluents for his common drink, as the disease now shewed itself plainly to be a hepatic affection, he had pills composed of venice soap, and aloes, of each half a dram ant. tart. three grs. made into twelve pills, of which he was to take two, in the day, and the antimonial at night, so long as the feverishness continued; about the fifth, his skin was first remarked to be of a brownish yellow color, the 7th, his pains were much alleviated, but as the pills purged him often, they were left off, and he had the antimonial powder with tinct. opi. fifteen drops at night. The tenth all his complaints appeared to be alleviated, but weakness, in order to restore his strength, he had one drachm of bark, noon and morning. He persisted in this course and appeared to get well, interposing a pill or two at times, until the 17th. When he complained

of another return of pain, in his hypochondrium, extending up to the breast; the blue pills were now given, two or three daily, and at night the antimonial powder—and next day, 18th, he had a severe pain, deep under the short ribs; his pulse was quick, but small, and his skin of a more yellow cast; from these appearances we doubted that even this mild mercurial, was given prematurely. He had one ounce of salts in the morning, and at night an antimonial draught—next day, 19th, he had a high fever, quick and small pulse, and a severe pain of the side. Antimonial powder in vinegar saturated with spirits of hartshorn, was given thrice a day—20th, he was much easier, a gentle perspiration was all over his body: he continued the last medicines—21st, the same medicines, and he endeavours to promote a perspiration, for he feels easy whilst it is going on; but as soon as it dries, he finds by experience that he is worse in all respects.—22d, the pain of his side was abated, but he complained of a diarrhea, and griping pains, with feverishness; a few drops of laudanum were added to his medicine in the evening—23d, the diarrhea and fever were much alleviated; we left off the laudanum, and continued the neutral mixture—and the 24th, he only felt an obtuse pain of the right hypochondrium. Now again we had recourse to the blue pills, one only evening and morning, which he continued until the 27th, when the diarrhea was returning, for which he had a small anodyne, and the next day Sal. Rochel, after which he continued the pills, recovering, and felt no pain, except when he lay on the infirm side.—30th, he took two of the pills which purged him, and at night he had a dose of dovars powder. From this he continued to get well, and taking the blue pills, until December 4th, when having no other complaint but weakness, he began the use of the bark, one drachm morning and noon, and had no complaint during the remainder of the voyage, which was eight months, two of which we passed in China, in cold weather, and the remainder, from thence to England. It is to be remarked that it was cold weather at Canton, when this man was taken with the disease; which although there are seldom

any frost; yet it is remarkable cold to the feelings, for a tropical situation. We have often observed old hepatic affections, also appear in the cold, stormy weather, off the Cape of Good Hope—the first who mentioned this to me, in my first voyage, was Captain J. Rogers, who now commands a British Packet, and was then an old India officer.

Any rational physician will, it is hoped, be easily convinced of the preference here given the mechanical division of mercury, in preference to the saline chymical preparations, where the object is, a wish to avoid suppuration, and at the same time to promote the action of the parts; and consequently absorption: for the mildest of the saline preparations, still retain something of their acrimony, which the simple division of the mineral, does not acquire in its preparation; therefore the ointment is on this account also, preferable to calomel. But we have not much faith in the application of it over the region of the liver, as the integuments are so thick and various, as the cutis, cellular substance, and its contained fat, the muscles, and peritoneum—besides the liver is not connected with any of these parts; and consequently none of the lymphatic trunks of the absorbents, pass between them; so that the ointment may as properly be applied to the limbs, or lower parts of the abdomen—the emplastr. ammon. cum. mercurio, we have sometimes had reason to believe, was of use; but that we attributed as much to the genial warmth, and relaxation of the skin, which it promotes, as to any effects of the mercury.—Of the saline preparations, we give a preference to the Merc. Dulcis, prepared in the humid way, and especially when applied in Clares manner, to the inside of the mouth only, without swallowing it. In this manner, we were much in the habit of using calomel, in all my voyages to India, on various occasions; and we are very much of the opinion, that it is attended with some essential advantages in warm climates; for it is less hurtful to the stomach when used in this manner. This is a material object where the digestion is always languid; at the same time it produces its full effects on the system, as

we have often experienced, for two or three grains of it always acts as a laxative with me in two or three hours, without sickness, or unnecessarily irritating and weakening the stomach.

A case of hepatitis, wherein the lungs were three fourths obliterated, and their place occupied by a serous fluid, without difficulty of respiration, or cough.

William Patterson aged 30, a native of the lower part of North-Carolina, of a phlegmatic habit. In the latter end of the summer of 1798, he appeared to be taken with a jaundice : he had also frequent attacks of an ague, in the fall, which was easily overcome, by the common means, although he seldom continued long well at any one time. These affections appearing but slight, he seldom lay by for them ; for the jaundice he had some emetics, and columbo root at first, which appeared to remove the complaint, until the winter, when, by getting cold from bad lodging, want of clothing, &c. his disease appeared to be of a dangerous nature, and he was obliged to keep his bed. An hepatic affection was now visible, and he was treated accordingly. He felt a pain in the hepatic region when pressed upon, and an obtuse pain at all times: as he was much reduced in strength, bleeding was not thought necessary ; he had pills composed of aloes and Castile-soap, two grains of each, calomel one grain, tartarised antimony one third of a grain in each ; of these he took one evening and morning, and they appeared to answer so well, that in two weeks he was evidently better, and in a month there remained nothing but weakness, which in two weeks more he had recovered from, and was to all appearance healthy and strong. At this time he was inoculated for the small pox, and had them favourable. From this until the latter end of summer, he appeared to be in tolerable health, although frequently complaining of uneasy sensations in the region of the liver: his urine tinged with bile, and his skin, and the whites of his eyes were a light brownish yellow ; but as he had been so often sick, and recovered before, he was unwilling to yield to it, until he became so weak, and his legs and abdomen so swelled that he was scarcely able to walk. He frequently complained of pain, and an imaginary tumour in the left



side of his belly ; he had mild laxatives, and the preceding pills, one or two in twenty-four hours, with an infusion of columbo-root ; but they did not produce any permanent advantage ; his strength failed gradually, but not so as to disable him from getting up without help occasionally, until the day he departed. By domestic care, this man might have got well after his first attack ; but this was impracticable, in the situation in which he was at that time.

What appeared very remarkable in this person's case was, that although the lungs were three fourths obliterated, resembling a concrete spongy mass, he never had been heard to complain of any difficulty of breathing, nor cough, by any person ; but he had the usual symptoms of a diseased liver, feverishness, &c. On opening his body after death, we found the liver full of small tubercles, and the gall-bladder contained about an ounce of a pale brown bile ; the stomach was contracted, and the intestines rather small, but little altered from the healthy state. There was about three quarts of serous fluid in the abdomen, the morbid state of the liver, although there were no large impostumations in it, nor much changed in size, we considered as fully sufficient to be the cause of all the phenomena of the disease. But rather through curiosity we took up the sternum, and to our great surprise, found the right cavity of the thorax occupied by a serous fluid ; and what at first surprized us, was the obliteration of the lungs, until we discovered them concreted into a substance of about one quarter of an inch thick, spongy, and adhering to the mediastinum, and pleura, the left lobe was about one third of it in the same situation, and yet this man had no cough, or difficulty in breathing.

In the first of the acute cases mentioned, mercury was used as a specific ; for so it was then considered in all diseases of the liver ; but in that young man, we could not be much surprized at its failure, for he was a very ungovernable patient, and would not keep his bed, but lay himself down any where on the chests, &c. often without any clothes over him, the weather being warm ; but seve-

ral others, who were more cautious, under acute affections of the liver, and were treated with mercurials in the early stages, shared the same fate. In all of them the liver was found suppurated on dissection. Commonly large collections of matter were formed; in some there were also found tubercles, and in others it was found in a scirrhus state. That being my first voyage, and consequently being Mate, Mr. G. Lewis, whose memory shall ever be revered by me, as a gentleman, a friend, and a surgeon, but who has long since died in Bengal, of this same destructive disease, of which he began to feel the effects at that time, shewed a good example of diligence in these investigations, so that we dissected all those who died. This has always been a rule with me, when practicable, ever since. We have known some affected with chronic cases for a number of years, without causing much uneasiness; an instance of which we remember in Capt. J. R. who was our first officer in my first voyage to India: but these affections are so common in those who go from Britain to India, that scarcely one half of those who are in the Company's employ for a series of years, escape them. In my last voyage, by using more caution in the administration of mercury, and by pursuing an opposite mode of treatment, and by getting better acquainted with the nature of the diseases we had to encounter: we did not lose one by this disease, out of a ship's company of one hundred and forty persons, and only one who died of a fever which he contracted at Bencoolen, while we stayed there, and when very bad with a nervous fever myself. This was the voyage which the Royal Charlotte made in 1790, and 1791, which may be discovered by my own journal, and case book, deposited at the India-House, and also by those of all the sworn officers: but this is not mentioned as a boast of success, but as a recommendation of the modes of treatment here recommended in hepatitis, fevers, and dysenteries. It is a service which merits my esteem, as the first in the world for the medical profession: but bad health, and the disagreeable company of some rude north country characters,

irregularly introduced into it, when regular mates were scarce, were the reasons of my leaving it ten years past.

It is very remarkable, how much the state of the liver is affected by violent passions of the mind, particularly by the angry or envious emotions: this is very evident in some persons of weak and irritable fibres, who are frequently taken with fits of sickness at their stomachs, and head-aches, from anger, and even in some instances with a vomiting of bile. This shews the sympathy very evidently, which exists between the mind and the hepatic viscera, as the stimulus is so immediately communicated to the biliary ducts, and the secretory glandular parts of this viscous; this effect of the passions was known to the ancients; some of them thought on this account, that the diaphragm was the seat of the mind. A consideration of this circumstance demonstrates the utility of an equanimity of temper in acute hepatic affections; it is to be remarked likewise, that diseases of the liver, are very apt to affect the mind, as when it is obstructed, or in a torpid state, and the circulation through it, is either difficult, or obstructed, it produces a melancholy disposition, with fear and despondency; this appears to be the reason, why the ancients thought these affections were caused by a black bile, and hence their name of Melancholia. In cases of this nature, it is obvious that stimulant and resolving deobstruents, are the proper applications, with exercise gently increased, and when the obstructions are by these means removed, then bitters and tonics, in order to increase the strength of the parts: the columbo root, &c. is very proper here, after aloetic, saponaceous, and mild mercurials. Violent exercise, is equally pernicious with violent passions, in acute affections of the liver; for either of them agitates these parts to an unsafe extent, and Celsus proscribes them in this disease. From this it is evident, that their bad effects had been known in those times, by experience. It is to be regretted, that all reason and analogy, is commonly laid aside, when there is any thing obscure, or difficult in a disease: but the whole of the mistakes committed in this manner, originate from medical men not paying proper attention to the different physical states of

the human body, its principles, properties, and laws, and its various actions, and the operations of the physical and mental agents on it, as regimen, medicines, &c.—This is an experimental mode of improving science, which were we to pay only a moderate degree of attention to, we should not be so very different in our opinions from one another; but so long as nominal distinctions, supercede the place of natural ones, and recipes are more attended to, than the agency of the different medicinal applications, it would be but a folly to expect a reform.

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*General Observations on the Affections of the Liver, &c.*

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IT often happens in this, as in most other diseases, that there may be an intermediate stage, in which it is difficult to determine between the acute, and chronic stages; or where there is no acute stage precedes, in this case it is the safest method to use the antimonial pills only, without mercury; but in case that after some continuance of them, they appear too inactive, they may be changed for the blue pills, with, from a quarter to half a grain of emetic tartar added to each; and where there are severe pains of the bowels, tenesmus, or piles, more acrid mercurials are inadmissible, on account of the additional pain which they so often promote. A peculiar appearance of the gums has been remarked in this disease; but it is by no means a common symptom; they are said to assume a cartilaginous appearance, and grow prominent, and of a pale colour, and hard; but this is an appearance so seldom met with, that we cannot place much dependance upon it.

It is but seldom that hepatic diseases appear in their own proper form; simple and uncombined on their access, they are frequently accompanied with dysenteric, or



feverish symptoms, and often with both; as may be seen by the cases which we have extracted from many others, in order to illustrate the two chief divisions of the disease; and also the different modes of treatment—it is on this account, that the hepatitis is so often overlooked, the fever, or dysentery, appearing the most obvious, are apt to attract all the attention of the physician.

It may be thought our criticisms on the abuse of mercurials are too severe, but let it be remembered, that when applied to those who either through ignorance, or irrational proceedings, sport with the lives and healths of mankind, there should be something still more severe than words applied, to such offences. Although this disease, sometimes makes its appearance, when there are neither fevers, nor fluxes prevalent; yet it must be confessed, that it also often accompanies them, and it is frequently complicated with both; and also with a jaundice, or hypochondria: and even with melancholy; so that if they could be classed as distinct species of diseases—the rule which maintains that two diseases cannot exist in the constitution at the same time, would not be applicable here; nor in fevers, or fluxes, which commonly rage at the same times, and in the same places, and patients: often alternating with one another; however the most dangerous affections, or the most prominent symptoms, are apt to arrest our attention, to the neglect of the others—a dropsy, for example could scarcely exist, independant of other diseases; but it may be said, that these are not original diseases; if so we have no objection to abridge the catalogue of the number of commonly received diseases, where there are no essential physical differences. But until that is done in a more masterly manner, than any thing hitherto attempted, it may be best to let them go by their own names, which are received by all mankind, and by which they are understood. We are, however, very firmly persuaded, that these summer and autumnal diseases, are very nearly connected, both in their natures and causes.

Obstructions and indurations of the spleen, are also, sometimes met with in the same places, and at the same

times, with diseases of the liver. One of the most obstinate cases of jaundice we have seen, was caused by an enlarged spleen, so pressing the stomach out of its place, as to cause it to act as forcibly, as a ligature on the biliary ducts, so that no bile could pass into the intestines. A diseased spleen is known by the pain and swelling being in the left side, rather backwards from the stomach; they are sometimes accompanied with a bleeding at the nose—By Morgani's accounts of them, they would appear to be as common in Italy, as the diseases of the liver: but as they do not often suppurate, the use of mercurials, and stimulant cathartics, may be had recourse to more early, than in the affections of the liver. These diseases of the spleen, are very common in low, marshy, and agueish situations; and especially when intermittents have been for some time prevalent, particularly towards the latter part of the autumn, in those who have suffered by these fevers. This is a clear demonstration, that they arise from weakness of the parts, and a languid circulation, which requires stimulants, bitters, and strengtheners, as snake-root, columbo root, &c. together with gentle exercise, as riding, and walking. Tumours often take place in the other viscera of the belly under similar circumstances,



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# DISEASES

OF THE

## *FIRST PASSAGES.*

Choleras, Diarrheas, and Dyssenteries.

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**A** DYSSENTERY may with great propriety be considered as Dr. Mosely, does after Sydenham, a fever turned inwards on the intestines. In this view of it, we are led to the most successful modes of treatment; for it carries our views beyond the local affection, to its radical nature.— But a cholera is generally caused by irritation merely, without any fever, but often with a quickness of the pulse; and may be soon and safely cured, without any attention to feverishness, merely by allaying the irritation, by warm bathing and warm demulcent drinks, as gruel, chicken broth, &c. and where the affection is very bad by a cautious, but frequently repeated exhibition of laudanum. Diarrheas sometimes take place at any time of the year, and in all climates, a cold moist air, eating much acid fruit, or new fermented liquors, are often causes of its appearance; it is a disease which is seldom ever dangerous, or difficult of cure; on that account, by those who are not much used to distinguish these affections, dyssenteries have been sometimes confounded with diarrheas.



These are a class of diseases exceedingly frequent, and dangerous in the latter part of the summer, and autumn; they appear to arise from an increased secretion of the intestinal canal, and sometimes of the liver. One variety of the disease has obtained the appellation of an hepatic flux, when attended with an immoderate secretion of bile; but it is very probable that it does not often arise primarily from the liver, but from its sympathizing with the intestines. By this means the liver may be affected in the same manner as it is in other autumnal diseases. But the origin, the predisposing and exciting causes, of this irritable state of the intestines, first claims our attention; for by knowing the cause, and investigating it to its source, it may sometimes be in our power to prevent its effects, and to be more successful, and rational in our methods of cure. This is only to be attained by knowing the true causes of these diseases, their morbid effects upon the constitution, and the operation of the remedies.

Dysenteries, and remittent fevers, appear to be nearly allied, especially those which occur in warm climates: this appears evidently, from their both attacking at the same time of the year, and their being often both produced by the same causes, and under the same conditions of the air, and predisposing causes, and from their often interchanging from one to the other.

A cholera, or diarrhea may be brought on, by an acrimony in the first passages, by whatever means it is induced; such as by eating crude, or indigestible substances, after the stomach has been for some time out of the use of digesting them, they generally produce the worst effects.

Obstructed perspiration, is also apt to cause a diarrhea, or simple lax—this frequently happens in the autumn, or latter part of summer, from wet weather, and sudden cold succeeding great, and long continued heats, after strong exercise in the heat of the day, and cooling suddenly; especially among those who are exposed to the night air, or get their feet wet, &c. because of the great sympathy between the external surface, and the stomach; for whenever the skin is constricted by cold, and moisture, the stomach, and intestines are in general affected by sympathy.

For the intestines are known to be irritable ; their structure being very delicate, and well supplied with nerves, and blood vessels ; from these considerations, as well as from experience, we are assured, that they are remarkably susceptible of the action of stimuli, by whatever means it is applied to them, or in whatever manner they sympathize with other parts affected. The lessening of one evacuation, commonly either increases others, or even sometimes causes new ones ; it is not to be wondered that in these cases it should fall upon the intestines, from their being rendered more susceptible, by the operation of stimuli on their very irritable coats.

The exact difference between a diarrhea, and dysentery, is not very easily known, nor well defined, even by the best practitioners. Nevertheless a person of experience, and information, will seldom be at much loss, on this account, either in the discrimination of the present state, or nature of the disease ; or in the methods of treatment suited to the different varieties, or stages of it : as the present and antecedent symptoms, habit of body, age, &c. are the only rational indications, either for the cure, or prognostic. But young, and inexperienced practitioners, are very often at a loss in all these respects ; for as they too often go by the name of diseases, without investigating the symptoms, and their nature, and causes, so as to form their curative intentions therefrom, but follow indiscriminately the methods found in books, or elementary lectures, &c. they will not readily find the differences so well marked in nature, as they are upon paper ; so that the ideas which they had formed of them, are commonly very confused ; but they are apt to imagine, in these cases, that the diseases are confused, and their books and ideas right. Therefore, they may be some time in suspense, which of the denominations to give to the disease, or the physical state of it present ; or methods of treatment—and here the advantage of medical philosophy ; a knowledge of the animal economy, and experience, are of eminent advantage. At the same time it is essentially necessary, to make a proper use of our own senses, and our reason, in these as well as in all other diseases—for with-

out these, all the information, and experience in the world, will not make a good physician.

As practical utility, and precision are the objects we have in view here; we do not consider distinctions of any use, which do not contribute to this purpose, in some degree—but as in practice, we often acquire a knowledge of indications, and presages, which it is very difficult to communicate, either by words, or writing; and in many instances impracticable, by reason of our sensations being much more extensive than our words, or our capacity of conveying our ideas in any language. For in touch, taste, smell, sight, and hearing, we have an immensity of perceptions which we cannot describe, as every one may be convinced, by the experience of people of every class, being so expert at recognizing their acquaintances, by the appearances of their faces at one view. We know this to be certain; but it would be impossible to communicate all these marks by words. The same may be said of hearing, for we can distinguish thousands of our acquaintances, men and women, by the sounds of their voices; and our nicety in discerning the difference of musical notes; and even our tastes, are more extensive and accurate, than the words of any language whatever; for who could distinguish the different, particular tastes by words, much less their combination—and smells, are as difficult to describe, and discriminate; and even touch, although the least extensive of all our senses, as we may know by experience, in distinguishing pulses; which those alone who have been long, and attentively engaged in can know. Now as we are certain, such stands the case, between our languages, and our sensations, we may, from hence be convinced, of the impossibility of communicating the whole science, of the practice of medicine, either by books, or lectures, or any other way by language; for it is but a part of our sensations which can be communicated in that way, by any language.

When there is simply a lax, we call it a diarrhea; it is generally accompanied with griping pains in the intestines, with borborygmi, or the noise of air passing from one part of the intestines, to another. This shews that

air is extricated from their contents : and the unnatural stimulus of it upon their very irritable coats, is a principal source of the pains caused by the disease ; this sensation is commonly understood by a griping. Diarrhea is in general without any inflammation of the intestines, or at least without any external appearance of it from the pulse ; but at the same time we are to remember, that inflammations of the stomach, or intestines, cause a languid, weak, but quick pulse. Draftic purgatives produce the same effect ; and even after they are evacuated, their effects sometimes remain in the intestines, and other viscera, and stimulate them to action, and secretion ; and there are sufficient proofs, that substances producing the same effects, are sometimes formed in the stomach, and intestines, as we may observe often happens from passions, wet feet, &c. and an acid in the stomach or intestines, or their contents becoming putrescent, or an over quantity of bile accumulated there, from an obstruction of the passages downwards. Or as it sometimes happens, from the matter of an abscess, of any of the abdominal viscera being deposited in the intestines, by their excretory vessels. Worms are likewise apt to cause a diarrhea ; by their stimulating them ; and even a weakness of the glands of the intestines, or an inactivity of the absorbents, or of the lacteal vessels.

When the peristaltic motion of the intestines is simply increased, and their contents hurried down through them before the more fluid parts can have time to be absorbed, accompanied with a weakness ; and these contents together with the excretions made by the membranes, glands, and excretories of the intestines, are speedily evacuated, then the disease is more properly termed a lenteria. In this variety of the affection, when there is great faintness, and weakness, and two or three evacuations are produced from the stimulus of a meal, it has been supposed by some, that the food was thrown out as soon as taken. This however is not the case ; for although the substances pass off more speedily than in health, they require a considerable time to pass through the first passages, the substances which were there before, pass off first ; but they are hastened by



what follows, often not much changed in its appearances by digestion. This affection seems to be caused merely by an increased weakness, and an over great degree of susceptibility of the intestinal canal and stomach. This affection may either be overcome by medicines, or go off of itself by a natural cure, or even cause death by exhausting the patient, without ever producing any inflammation: here sedatives and strengtheners are obviously requisite. But when the principal characteristic symptoms shew inflammation to be present, such as violent pains of the intestines, tenesmus, feverishness, &c. it is probably the erysipelatous species of inflammation; it often appears to begin in the stomach, and gradually proceeds downwards to the rectum, accompanied with a frequent desire to evacuate, with straining and pain, and the evacuations either consist of mucus in various forms, and appearances, from the inflamed surface of the intestines, or serous matter, or in some instances blood in large quantities, and often repeated.

Thus it would appear that when an irritability affects the whole of the first passages suddenly, it produces cholera; and when only slowly and slightly affected, it causes a diarrhea; but when the affection of the whole canal comes on slowly, and not affecting the stomach much, by sympathy or otherwise, but occupying the lower part of the canal or the rectum, with a fever and tenesmus, and other appearances of great irritation, then the disease is a true dysentery. Dysenteries may occur in the temperate climates, in the autumn, but much more frequently in warm countries, especially where there are marshy exhalations, impregnated with those from the decomposition of animal and vegetable substances; which processes extricate noxious airs, in such considerable quantities, as to impregnate the atmosphere. Some have, without sufficient reason, attributed the dysentery to the use of fruits, in warm weather; but it should be remembered, that although dysenteries appear in the autumn most commonly, they are the more prevalent in proportion to the heat and moisture of the preceding summer; for when the summer has been long and warm, and frequently wet, we

are apt to have many dysenteries; and when the summers have been more moderate, and less rainy, there are fewer, or even none of them some years. And we often see many people seized with a dysentery, without eating any fruit; nevertheless fruit may act as a purgative in those predisposed to it; and by accumulating a superabundant acid in the stomach, &c. a diarrhea may follow, which on some occasions, degenerates into dysenteries; but this often happens whether they eat fruit, or not, when they have been exposed to the other predisposing causes. Diarrheas often happen in warm climates, after people have been for some time at sea, and habituated to an uniformity of food, and drink, such as dry biscuit, and salt meat, without any fresh vegetables, or fermented liquors; for after living for some months on these substances, as must be the case in a voyage to India, a very trifling change of diet affects their bowels with griping pains; and if they are much exposed to marshy exhalations, from an unwholesome neighbourhood, this may turn to a dysentery. We have had repeated experience of this when in India.

The predisposing cause of dysenteries appear to act in this manner; during the continuance of warm weather, the fluids are invited by the heat, and relaxation of the vessels on the surface of the body, to flow outwardly: and the internal large vessels are left in a state of emptiness, and relaxation. By this means they are weakened, and become more susceptible of the operation of stimuli applied to them; and when cold is applied to the surface, so as to cause a contraction of the extreme vessels, then the blood is thrown upon the internal parts, so as to prove a stimulus to them. Which, if the body is already predisposed, by the effects of noxious miasmata, having preceded the application of cold, for some space of time, while the heat lasted, a dysentery is commonly the consequence. The inflammation in this disease appears to be of the erysipelatous species, we believe seldom with any mixture of the phlegmonous; and the idea which Sydenham and others had of the dysentery, when they called it a fever, (*sui generis*) turned inwards upon the intestines, appears to

be a very just one, and well adapted to explain its nature and appearances. But we are not to confound the different stages of it together; for as proper distinctions, where they point out different indications of cure, and modes of practice, and useful discriminations, are the spirit of science, they are highly necessary to be applied to this disease, as well as to many others; therefore it would be a very imperfect method to be too general, either in our definitions, or our modes of treatment, we must therefore learn to distinguish one variety from another, as well as the different stages of the disease, before we can be competent to attack either variety with success.

A true dysentery, is very rarely a disease either of cold, or temperate climates, in that violent, and destructive form, in which it appears in the unhealthy, tropical countries; yet it sometimes succeeds diarrheas, which are caused by obstructed perspiration, after warm summers, and in crowded places. When once it has appeared, if the air is confined, and strongly impregnated with the effluvia arising from the sick, the disease may, and often does become infectious, as it often does in the confined habitations of the poor, and in prisons, hospitals, camps, and such places. And those who harbour any doubts of the dysentery becoming infectious in such situations, must have been very much confined to a local practice, and also unfaithful to the reports of the most eminent practical physicians, who have wrote upon it, as Pringle, Degner, Clark, and many others. But in the mild form in which it appears in an open country, the evil effects of its infectious nature, may scarcely appear in any conspicuous manner; but neither does the virulent infection of the pestilential fever operate in an open country.

The dysentery has sometimes appeared as infectious and destructive as the plague, and swept away whole fleets, and armies, and besieged towns, and garrisons; many instances of which are on record, both in medical, and common civil history; particularly in the war which concluded in the year 1763, between England and the combined forces of France, and Spain, when the combined fleet lost in the hospital at Brest, twenty-seven thou-

sand men, one hundred and fifty nurses, and all the medical people but one. Diseases of this nature have often been denominated plagues, from their raging so fatally ; and there is no room left to doubt, that when the air, by being confined about those who have the dysentery, especially where there are a number sick at the same time, is as infectious as any fever, especially where the predisposing causes have prepared people to receive it, as often happens in the autumn.

Dysenteries become infectious in the same manner as autumnal fevers do, by a neglect of cleanliness, impure air, or in crowded ships or houses, especially where they are ill ventilated ; hence the great advantage of free air, and cleanliness, in preventing these diseases from becoming infectious, by their effluvia impregnating the air very strongly ; the confined air of either houses, or ships, becoming strongly impregnated with the effluvia of the sick, causes the disease to be more malignant in those who are infected with this strong effluvia ; and the malignancy increases in proportion to the strength of the impregnation of the atmosphere. Hence the reason why infectious epidemics become so much more dangerous and malignant, when they are very infectious, than at any other times ; for the more prevalent and infectious they are, the more sudden, and violent are their effect on the human body.

The method of preventing the spreading of the infection of the dysentery, is much the same as that which answers best in fevers, as free air, and cleanliness about the sick ; not suffering any excrementitious matters to remain in their apartments ; and so disposing of them that they may not impregnate the air with their effluvia, so as to prevent their communicating the infection to the healthy.

On board of ships, these precautions are more particularly necessary, with respect to cleanliness ; and wherever men are much crowded together. For it is to be observed, that diseases are much more apt to become infectious on board of ships, than on shore, on several accounts, and the infection is likewise more apt to spread in ships on account of the want of fresh air between decks, when there are no ports or scuttles open, as must often be the



case in stormy weather; because the decks of ships are always much lower than the ceiling of rooms, in the smallest houses. But a third, and greater cause is that of men being much more numerous in the same space in ships than they ever are in houses; and this with the other causes are fully sufficient to generate a vitiated air. By the respiration of a number of people in a confined air, they soon deprive it of its vital principle, which is indispensibly necessary to support animal life, and health; and likewise the exhalations from their bodies, soon impregnate the air with their effluvia; and in this way they not only propagate infectious diseases already prevalent, and render them more malignant, and virulent; but they likewise often generate them originally—from all these causes concurring together, it is evident that ships are more apt, either to generate, or to propagate infection, than either prisons, or hospitals, so justly suspected of it.

There have been many ideas of the causes of dysenteries; we hope this will appear more rational than some of them. It has the sanction of a variety of experience, in different parts of the world, in which we have practised, in its favour, and treated this disease in a manner nearly similar to this recommended; the description is such, as the nature and appearances of the disease have suggested to us, both in warm and temperate climates.

Indurated feces have been, by some eminent practitioners, and teachers, said to be a very general cause of the dysentery: particularly by Pringle, Chalmers, and Cullen, who does not appear to have ever had much practice in true dysenteries himself, but to have followed others in his account of this disease, in his first lines. That indurated feces, as well as rancid or oily food, or worms may bring on a lax, there can be no doubt, especially in very irritable habits of body, and of the intestinal canal. But we are very confident from experience, and also, from the observations of other practitioners, that indurated feces are by no means such frequent causes of dysenteries in warm climates, as those eminent practitioners would persuade us to believe; for there are very few, either of the modern, or ancient phy-

ficians ever mention the circumstance: and besides, it does not appear credible that hardened fœces themselves, could put the whole human frame into such high fevers, as generally attends true dysenteries. Therefore there must be a predisposition to the disease existing in the constitution, before any of these exciting causes can operate effectually in producing this disease. And the predisposing causes as we have already shewn, are not much different from those which cause autumnal remittent, and intermittent fevers.

There are sufficient reasons to persuade us, that when the human frame is predisposed to the dysentery, by being exposed to the foregoing causes, very slight occasional causes, will excite the disease; such as sudden alterations of the temperature of the air, from heat to cold; and this is very commonly the case at the time when it appears; but especially rainy weather, after great heats, are very apt to cause its appearance; and the more so, if both cold and wet weather suddenly sets in together. For the cool air, and dews of the evenings, after the heats of the days, are peculiarly apt to cause the dysentery to appear; and they will cause it the more certainly, if those who are exposed to them, are in an inactive situation: as sitting out of doors, or in open boats, standing or sitting in any manner. For then the external surface is chilled by the cold, and the small vessels contract, and get into an inactive state, and the fluids are forced inwards upon the large vessels, and interior viscera, particularly those of the belly, and from their lax, structure, and the slowness of the circulation through them—the blood, upon its return from them, having to force its way with very little assistance through the peculiar system of the liver. When we consider this and the preceding account, we may find sufficient reasons for the diseases in question.

Redundancies of bile have often been said to be the cause of dysenteries, as well as of fevers, the reason is obvious; bile is the only one of our secreted fluids, which has a particular colour of its own; of which it cannot be deprived by any of our digestions, through which it passes,

nor by mixture with any of our fluids; except the acid of the stomach, which renders it black. And on account of its copious appearance it may be rendered hurtful by its quantities. But the reason why the quantity is thought to be hurtful, is because it is the only fluid secreted into the intestines, which is very conspicuous—the other fluids are in as great quantities, in proportion, and if they were as easily distinguished, diseases of this class would as often be called pancreatic, as bilious; and as to the operation of heat on the bile, it is contrary to fact and reason; for heat can have no immediate effect on the bile, nor on any of the interior viscera, but in a secondary manner: for it is a fact as well established as any we are acquainted with, that the blood, in the interior viscera, is no warmer under the heats of the torrid zone, than within the polar circle; that is, about ninety-six degrees of Fahrenheit's thermometer. Therefore the heat of the weather, cannot possibly exert any immediate action on the bile, whatever it may on the irritable parts of the body on which it can act, either immediately, or through other intermedia. as the skin or other superficial parts.—The stimulus, however, which causes a large secretion of the bile, is mostly communicated along the duct, from the stomach and intestines.

It appears that in all the diseases of the intestines, there is a considerable degree of susceptibility of stimuli, and this is a principal cause of their affections, whether cholera, diarrhea, or dysentery; and by whatever means this state of the intestines is induced, it may cause these diseases, in the manner explained; and it may be attended with inflammatory symptoms, in those who are affected in these ways, particularly in the young and robust. The dysentery in particular, is more frequently attended with an erysipelatous inflammation of the intestines, but irritation alone, when they are very susceptible appears to cause choleras, or diarrheas—but we are not to depend upon this to be always the case; for irritations on very susceptible parts, may cause either inflammation or spasm. But of this, we are to judge from the habit of body, the

external appearances, the pulse, and the symptoms of which the patient complains.

Inflammations of membraneous parts, as the intestines, and their contiguous parts, notwithstanding their muscular fibres, are very different from simple inflammation of muscular substances; this last being by some, alone called the phlegmonous inflammation, it is commonly speedy in its progress, either to suppuration or dissipation: but inflammation of the membraneous parts, are very slow, either in coming to suppuration, or in being dispersed.—Some have confined the erysipelatous inflammation, to membraneous substances, and the distinction is very often just, although by no means to be generally depended on; and there are sometimes a mixture of the two kinds of inflammation in some instances, which principally attack parts, the composition of which are membraneous, interspersed with muscular fibres, and of this texture the intestines are. And reasoning from analogy from the external parts of the same structure: and also the methods of cure which are most successful in both, which are the surest data to proceed upon; this account of the disease appears to be founded on facts and reason.

Dr. Cullen would make the principal difference between diarrhea and dysentery to be, in this, that the dysentery is always propagated by infection. And that the diarrhea is not infectious; this would be a very imperfect distinction. Dysenteries very often appear suddenly when wet, and cold weather succeeds long heats, without any possibility of infection, although it may become so afterwards; yet if a rigid adherent to Dr. Cullen's doctrine, were to treat the disease, as a simple diarrhea, until he was convinced that it was infectious, and consequently a dysentery; he might be too late for many of his patients, before he had found out the disease.

The concomitants of feverishness, tenesmus, and violent pains of the intestines, are much better symptoms to know a dysentery by, than its manifesting itself by infection. The tenesmus however, does not appear in common so early as the other symptoms; it is commonly later in making its appearance, and also in giving way.



This is probably the reason why it was supposed that the irritation and inflammation, first begun in the stomach, and from thence descended down through the whole course of the intestines, and finished at the rectum. The descent however, is not gradual, for the intestines appear to be much affected from the beginning, either by sympathy or otherwise; and in the dissections of those who die, some parts of the intestines are much more affected than others, with the appearances of inflammation, and sometimes petechial spots, which may be a consequence of the great irritation, and inflammation, but not their cause.

Most of the Ancients supposed ulcers of the intestines to be the immediate cause of the dysentery, until Alexander, of Tralle, shewed them to be rather an effect of the disease, than a cause, when they did happen, which they do not always. For the interior membranes of the intestines, may be long in a state of irritation; and like every other membranous surface in that state, produce a larger secretion of mucus—and sometimes, though not generally, (aphthæ) small white spots, which form ulcers, when they have gone on for some time, which ulcers, though small have prominent edges, and discharge a serum. But the serous discharge, does not depend entirely on the ulcers; it is often discharged from the inflamed surface of the intestines, long before any ulcers can have time to be so far advanced; and this we know is the course of morbid irritation, in any other membranous cavity—for instance, in gonorrhœa, coryza, or catarrh. They begin first, with an increased secretion of the natural mucus, which soon becomes thin, and acrid, and does not answer for its natural use of defending the surface from its contents. Therefore the inflammation and its cause, still increases the irritation, upon these accounts, and of consequence, the vessels dilate, and suffer serum, and even red blood, to escape into their cavities. This is the common course of a dysentery, and the reason why the disease is more apt to fall upon the intestines, than on the lungs, or any other of the viscera, may be seen in what is said already.

Dr. Cullen enumerates many varieties of the dysentery, under the head of diarrhea, and what is of much worse consequence, he absolutely forbids the use of all sorts of purgatives, in every variety of the diarrhea, (unless we can reckon emetic tartar among purgatives) even in the critical evacuation of fevers, when it falls upon the intestines—he makes no exception to the general rule, and the discharges from internal abscesses, when they are evacuated by the intestines, &c. in these, although he mentions them, he makes no good practical discriminations: but forbids absorbents, and purgatives, and recommends astringents, roborants, and opiates. But we are certain, that these precepts, by being faithfully followed have been the cause of much mischief in cases of this nature. And we hope the bad effects which they have, and will always produce, will deter every rational practitioner against a practice, so pregnant with evil consequences as that must be; for by shutting up such discharges in the passages, we may expect fatal effects: as dropsies, tumours, and gangrenes of the injured parts, from the acrid matters being pent up in them, which should by all means be evacuated. By this and many other instances we may see that medicine, as well as philosophy, has often in the schools degenerated into speculations, especially when practice, and reason, are not duly attended to.

We are sorry that we must differ in opinion here from a practical author on this disease, (Dr. Mosely) who practised on land in the West-Indies, and probably in well ventilated military hospitals, and private practice, denies that there is any infection, in this disease: and in fevers he ridicules the idea of it. In the West-Indies, from the free air, which there is no reason to guard against, either in fevers or fluxes are good reasons why they are not infectious: but even there, where many people are crowded together in hospitals, or jails, they become infectious; but particularly in ships of war, or transports, where many people are crowded together, and the air vitiated by their effluvia; and had Dr. Mosely seen either a bad fever, or flux in such situations, we can depend on his good sense, he would have been

convinced they were both highly infectious. A persuasion of this, and the most effectual means of preventing its spreading, is a subject of the first importance to a practical physician, in any climate. Mosely says, as to contagion from infection in the dysentery, he never saw it. We can believe him; but he might have seen infection without any contact, communicated through the atmosphere; for we do not suppose that it requires actual contact to propagate this disease, any more than fevers do: but with many others, he does not appear to have a just idea of these terms. Was this only an idea of the schools, we would not think it merited much attention from practitioners.

After what has been said, the symptoms are not difficult to be understood. The diseases with which the dysentery is most frequently combined, are remittent fevers, diarrheas, or choleras, sometimes at the beginning, but it may readily be distinguished from the choleras—this last being so rapid in its progress, coming on with frequent vomiting and purging, of bilious matter, great and sudden weakness, and languor, and by its soon giving way to the proper treatment, as diluents, with bland oils, as that of; almonds, or olives, and opiates. Whereas, the progress of the dysentery is more slow, and generally aggravated after the use of opiates, at the beginning; but the dysentery often begins more like a common lax, and goes on increasing, in violence, with an uneasiness at the stomach, and violent griping pains in the intestines, with a frequent desire to evacuate, with little or no effect; or perhaps a little mucus or serum is only discharged, whereas, in a diarrhea, the discharge is generally large, without those fruitless strainings, and gripings, tenesmus or fevers; for tenesmus, violent griping pains, and fevers, are the principal signs by which to distinguish a flux, or dysentery, from a diarrhea; and to these may be added, as the disease advances, the mucous and serous discharges, which never appear in a diarrhea; for it is not accompanied with the signs of violent inflammation, and irritation in the intestines; but in the dysentery these signs are generally apparent. We

may likewise judge of the disease from the season of the year, or the diseases which are prevalent, dysenteries mostly appearing in the autumn, or the latter part of summer; but they sometimes appear in spring, and at other times. Diarrheas often proceed from slight causes, as obstructed perspiration, eating much fruit, or rancid, oily food, and are easily overcome, by a dose or two of rhubarb, an emetic, and laudanum; but in a dysentery, rhubarb, or laudanum, leaves the patient worse after their use. We are to distinguish it from fevers also by a knowledge of the prevalent epidemics of the time, and also from the violence of the symptoms; for although it is always accompanied with a feverishness, the dysentery shews itself to be the reigning disease, although sometimes they are both prevalent at the same time, and interchange from one to the other. In this case we would advise, as in all other such combinations, to pay most attention to the most urgent or prevalent symptoms; and as most part of the treatment of one disease in this case, answers for the other, when the indications are properly attended to, there is but little danger of falling into any capital mistake here. Although the dysentery very frequently begins as a diarrhea, and goes on increasing in violence, from the predisposition of the patient, and the exciting causes, operating together, yet in such cases, it will not yield to the common remedies of diarrheas, and soon demonstrates its nature, by the symptoms above mentioned. Yet it sometimes appears more suddenly, with feverishness, violent griping pains, sickness at the stomach, frequent, but fruitless straining, which seamen call dry gripes, with great irritation, and inflammation of the intestines, with spasmodiac contractions in different parts of them; this last symptom may be increased, by the hardened feces, which are pent up, and their more fluid parts absorbed by the heat and inflammation. This also appears to be the case in the pestilential fever: for there was generally a colliqueness accompanying it, with an inflammation of the stomach and intestines; for violent inflammation here may prevent the natural excretions in the same manner,



as in fevers often happens from the same cause: but a costiveness with hardened fœces, is not a general symptom of the dysentery.

We remember experimentally, when the dysentery was beginning its attack on the west coast of Sumatra, that the stomach was the first part where we commonly perceived the sickness, and from thence it extended to the intestines, causing griping pains, and a lax, and when ten days in this condition, and taking several emetics of tartarized antimony, and ipecacuanha, and purgatives of the neutral salts. Nevertheless, the disease gained ground, and did not appear to be much alleviated by these medicines, and soon turned to a true dysentery, with feverishness, tenesmus, and frequent and large discharges of sanious matter, which lasted two or three weeks, with calls every hour or oftener, in the course of the day, and forepart of the night. And in every case which we have seen, the pain and violence of the disease was exasperated towards evening every day, and increases until about twelve o'clock at night, and then it commonly becomes easier, with some sleep, after which they are commonly easy all the morning, until about twelve at noon, when the tenesmus, and griping pains, in different parts of the bowels, and feverishness return as before, and runs the same diurnal course over again.

The dysentery, as well as fevers, is rendered more malignant, by infection; and by that septic state of the solids and fluids, which predispose the body to remittent fevers: so that by this means, when there are many persons labouring under the disease, and the air strongly impregnated with the infectious effluvia, the disease is more rapid in its course, and more dangerous, than otherwise it usually is. In children, besides the causes common to grown people, there are others which predispose them to the dysentery; their habits of body are more irritable, and the cutting of their teeth, increases that disposition, and irritates the intestines, as well as the stomach, by sympathy; and by that means disposes them to diarrheas, and dysenteries. And another cause with them, is, that about that time, they are over fond of green fruit, and

sweet substances ; and they are then beginning, besides their milk, to use other food, which must certainly be hard of digestion, to their weak organs, more especially as it is quite new to them. There are some children however, which are little affected by any of these causes, being of strong constitutions ; even in the closest towns, where this irritable disposition is much more prevalent, than in the healthy parts of the open country. For there it is but a rare disease with children, even in summer, when the causes of it are more prevalent, from the heat, and increased irritability ; hence the open healthy parts of the country, are the best situations, either to prevent, or to cure this disease in children ; but large and close built towns are their destruction.

It is now time that we should come to the cure of the dysentery ; and in the first place, although bleeding may not be the first thing to be done, yet as it has been a question much agitated by practitioners on this disease, we should in the first place, deliver our sentiments of it ; for some practical writers absolutely forbid it in the dysentery, and others recommend it as generally useful, or absolutely necessary ; but the difficulty is, that general rules, in the practice of the healing art, without proper discriminations, are oftener hurtful than useful. Could any of those who insist that bleeding is improper, assure us that we should never meet with any person of an inflammatory disposition in the dysentery, we should agree with him, and never think of taking blood, of any person under the disease. And those who insist on its general utility, we would answer in the reverse manner ; that in case the disease was always accompanied with an inflammatory tendency, bleeding would be always necessary. But as neither of these cases are universally present in this disease, nor perhaps in any other, therefore, as general rules, they are both equally fallible ; and therefore, every person, who is properly qualified, must be left to judge for himself, whether his patients in this disease, and how many of them, require this operation, by their ages, sexes, habits of body, &c. and this may be a general rule applicable to the operation of phlebotomy, either in this, or indeed

in any other disease, and the least exceptionable also. The distinguishing erythism, or irritability, from phlegmonous inflammation, will be as necessary here, as in any other diseases; for it is in the latter only, where drawing of blood can be of advantage, and this state may be the easier learned, as it is the young, robust, and plethoric, who are most apt to be under a phlegmonous disposition; and on the other hand, the aged, weakly, and irritable, are more apt to labour under the erythematic, and irritable disposition; and in these last, blood-letting is seldom proper, and often hurtful, because it reduces their strength, and vital energy, without removing their irritability, or taking off the erythism, and leaves them in a worse state than they were before it was performed.

In the strong and plethoric, when the pulse is hard, full, and frequent, bleeding is absolutely necessary, and may be repeated in proportion to the urgency of the symptoms; but that we must leave to the prudence of the practitioner, who is to be guided by his experience, and his reason. When much feverishness accompanies the disease, with pain across the orbits of the eyes, and they feel as though they were swelled, it is a very strong indication for bleeding; and so is a burning heat, and pain in the stomach, which sometimes occurs here, and acute griping pains in the intestines. But bleeding may be the more necessary, where the situation is generally healthy, and on the approach of hot weather, as in spring, or summer; than in low, wet, marshy, and agueish situations; for in many such situations as this, the inhabitants scarcely ever require bleeding in any disease; but strangers lately arrived from more healthy situations, frequently require it, in case they are taken with this disease, within a year or two after their arrival. There is such a district of country as this mentioned, producing agues, remittents and fluxes, extends with very little interruption from Wilmington in Delaware, to the southern boundary of the United States, and from the sea coast, to from fifty, to one hundred miles inland, where the inhabitants can very rarely bear bleeding in any disease; but where they have the advantage of the sea air, there are some exceptions,

and in a few other healthy situations. Bleeding must appear to any reasonable man improper in the weakly, the aged, and those who are much reduced previously, or worn down with other diseases, in any situation, but more so in marshy, low, and unhealthy districts of the country, where agues are prevalent. When the dysentery comes on slowly, beginning as a diarrhea, it is but rarely that bleeding would be of any advantage; as this variety of it is seldom accompanied with any inflammatory disposition.

A rational practitioner should always get acquainted with the causes of the disease, whether predisponent, or exciting, in order to direct him to the best means of cure; next to bleeding, or perhaps before it, the state of the first passages should be taken into consideration. It will generally be necessary to begin the treatment by giving an emetic in the evening, and after it has operated once, to order a pint of warm water, or an infusion of camomile flowers, which may be repeated every time it operates. And as soon as the emetic is done operating, the patient should get into bed, and wrap himself close in the bed clothes, in order to promote a perspiration. And by that universal sympathy which prevails between the skin; and the stomach, and intestines, and other viscera of the lower belly, to cause a derivation of the humours from the intestines to the skin. This is a circumstance of the greatest consequence in all diseases of the stomach and intestines, and more particularly in this disease, and should at all times be kept in view, through the whole course of the treatment. But although emetics are generally proper in the beginning of this disease, there are cases in which they are improper, as where there is a great degree of irritability about the stomach, and a diseased liver; for this being the situation of the patient, vomiting would do far more hurt than good, by increasing the irritable state of the stomach, and communicating that disposition along the biliary ducts to the substance of the liver, by sympathy; and by the agitation of vomiting, as we can see by the increased secretion of bile, caused by strong emetics, this might be productive of bad consequences, as we are persuaded it has often been, by either causing a simple ob-



fruction of the liver to degenerate into an imposthume, or by the bursting of small ones, which might be otherwise dissipated by absorption, which we have sufficient reason to think they often are. In cases of this nature, it would be better practice, to trust to mild laxatives, as the neutral salts, particularly rochel salts, (soda tartar.) or vitriolated tartar, (kali tartar) glaubers, or epsom salts; as these evacuate the first passages, without causing any great commotion in the parts, but are rather of a sedative cooling nature: and even where emetics are inadmissible, these purgatives are absolutely necessary, in order to carry off the acrimonious contents of the intestines; or castor oil, (oleum ricini) is an excellent purgative, especially where the griping, and pain of the intestines is severe; it answers very well as a purgative at any time of the disease—it may be made more agreeable, by a drachm or two of compound tincture of fenna, or such like tinctures; and as the neutral salts are very disagreeable to most people, they may be made less so, by a little lemon juice, or vinegar, or acid of vitriol, and soft sugar, or molasses.

All through the cure, a perspiration should be promoted by the warmth of the bed, and warm diluting drinks, and antimonials; these, when their united actions are joined together, are apt to produce a diaphoresis, and turn the impetus of the fluids from the interior, to the external surface, or turn the vital energy outwards. For antimonials, although powerful diaphoretics, yet when the patient is exposed to cold air, after their use, and before they have had time to operate by perspiration, are turned upon the stomach and intestines. They are very apt to cause a vomiting, or griping, by being repelled from the surface, together with the insensible perspiration, and the constriction of the external parts by the cold, being communicated to the stomach and intestines, and by them to the other contents of the belly. But the pain and uneasiness caused by the disease, is generally soon relieved, after a perspiration is promoted, if this can be accomplished.

Although ipecacuanha is a mild emetic, yet in the early stages of the dysentery, its utility is doubtful, and

that upon account of a property for which it was formerly much extolled, as universally useful in this disease; we mean the astringency which it commonly leaves in the intestines, after its operation is over; for any thing of an astringent nature, is to be avoided as very pernicious, in the early stages of the disease, whilst the feverishness runs high, or there are any acrid matters to be evacuated; and although this may appear to be an uncommon doctrine, it is nevertheless true. Antimonial emetics, therefore are preferable, or at least, a grain or two of tartar emetic should be mixed with ten grains of the ipecacuanha; for this, by its laxative quality, will prevent the worst effects of the ipec. when it is used.

Whilst the pain and feverishness continue obstinate, laxatives of the neutral salts, or castor oil, which is a medicine of the greatest importance in this disease, should be repeated every second day at farthest; or where the symptoms are urgent, with violent griping, they may be taken in small quantities every day, so as to keep the passage gently open, through the intestines, and small, or frequently repeated doses, are preferable here to larger ones, as they answer the purpose of evacuating the acrid, contents of the intestines, and keep the passage open; preventing painful strictures without raising any commotion in the system, which in this stage of the disease must necessarily be attended with disagreeable consequences.

The drinking plenty of warm diluting fluids, as gruel, rice, or barley water, fresh broth, or whey, are peculiarly useful, in the early stages of the disease, and they should be taken frequently; but cold drinks should be avoided, although they are frequently desired by patients, in this disease; yet until the violence of the malady is over, the patient should not be permitted to indulge himself in this respect.

As to the choice of the different preparations of antimony, in this disease, or any other feverish indisposition, if we wished to cause a vomiting, or give antimonials with that intention, we should choose these preparations of this mineral, which are already in a state of solution: as the antimonial wine, or such of the solid pre-

parations of it are the most easy of solution, as emetic tartar, which being a combination of the active reguline, or metallic part of the antimony, combined with the acid of tartar, forming a species of salt, or vitriol of antimony, which is very easy of solution in the stomach, and both speedy, and certain in its operation, as an emetic.

But where there is a great degree of irritability present in the stomach, it might be dangerous to increase it by vomiting; and there is a necessity for giving an antimonial as a febrifuge, to promote a perspiration, and gently to evacuate the intestinal tube, and at the same time to excite the delicate vessels, and the absorbents. For this purpose both reason, and experience dictates to us, to use those preparations of this mineral which are slowest of solution, and yet are certain in their effects when properly exhibited. Such preparations we have in the antimonial powder of the London dispensatory, or the Kermes mineral of the French Pharmacopeia's: both these are medicines of undoubted efficacy, in most species of febrile diseases, in lowering the fevers, and alleviating the morbid disposition; but at the same time their operations are to be promoted by the warmth of a bed, and warm diluent drinks, such as mentioned above; and also warm bathing, particularly of the feet; and they will rarely fail of lowering the fever, although they should produce no sensible excretion in any way, in the course of six, or eight hours after their exhibition. The usual hour of going to rest, is the most eligible time to take these febrifuges, as there is then a natural tendency to rest, and perspiration; but in cases of urgent necessity, about five grains of the antimonial powder may be exhibited every six or eight hours, until it has produced its effect, keeping the patient warm in bed at the same time; sometimes however, it will not produce the desired effect—when there are great irritability, and feverishness, and a dry constricted skin; in this case warm fomentations, or the warm bath, will greatly assist, and promote its operation, by relaxing and soothing the external surface, and removing the stricture from the skin. And in some obstinate cases, it may be necessary to have recourse to lauda-

num, or opium; but this drug is not to be used in the beginning, or height of a dysentery, without the most urgent necessity; for at these times it always leaves bad effects after its use, unless care is taken to prevent them by adequate means, as we shall describe hereafter. For we have seen the worst consequences follow from the use of it: not only in true dysenteries, but in diarrheas coming on in fevers, being restrained by it: where tumefaction of the abdomen, and death was the consequence in a few days. Here the lax was no doubt the critical discharge of the fever; but there is something of the same nature in every dysentery, which should not be restrained until the fever is first cured; and then these medicants may be used with more safety, and even advantage; and so may astringents, and ipecacuanha, besides the astringent properties which it possesses, produce another effect, no less hurtful in this disease, that of causing a tenesmus in some people; and this alone is a sufficient reason against its use here; and on the same account, it is scarcely necessary to mention that all sorts of stimulant, and drastic purgatives, are very improper: as calomel, jalap, scamony, aloes, fenna, &c. and also rhubarb, although too frequently, and even indiscriminately used, by the ignorant; as well as by some medical men, who should know better, in some instances. For as the intestines are extremely irritable in this disease, these stimulant purgatives readily cause violent commotions, and increase their actions which are already over great, and by this means increase the violent pain, griping, and tenesmus, with spasmodic strictures, and excretions, by their action upon the very sensible coats of the intestines. As they are soon, when in this situation, deprived of their native mucous lining, or cover; as explained elsewhere; and are therefore undefended, and exposed to the acrimony of their contents.

Where great symptoms of irritability prevail, with restlessness, and want of sleep, a small opiate, may be given at bed-time, taking care at the same time to order a mild laxative, for the next morning, to clear the intestines from the accumulated feces; which are collected



by the inactivity which it causes—for if this is neglected, the pain, and irritation will return with increased violence. On this account it would always be best, where they can be dispensed with, not to use opiates, especially in the early and inflammatory stages of the disease, for here they are always dangerous, and often pernicious; but towards the latter end of it, when the inflammation and feverishness is gone, and the increased secretion is kept up by irritability, and a weakened, and relaxed state of the intestines, the opium as well as rhubarb, may be very useful, and should be given. And even astringents and strengtheners, as bark, the extract or decoction of logwood, simaruba, or even allum, or catechu; but these are to be used with great caution, &c. in the beginning of the disease, when attended with febrile symptoms, it should be treated nearly the same as a fever.

The indiscriminate use of rhubarb, opium, and astringents, have been causes of much unsuccessful practice; and have often hastened a fatal termination in this disease, and are yearly the cause of many thousands of deaths, in different parts of the world. From a superficial view of the disease, the discharge from the bowels is supposed to cause all the other symptoms, whereas it is only a consequence of the original affection—but this happens in the same manner as bile, was thought to be the cause of some fevers; where from the irritation communicated from the intestines along the biliary duct; it has either appeared on the skin, in the stomach, or has been carried downwards, by its secretion being increased, and sometimes its course interrupted.

Notwithstanding some judicious practitioners (in particular Dr. Baker,) have taken notice of the bad effects of rhubarb, opium, and astringents in some stages of dysenteries; they are yet very much used by common practitioners, in all stages of the disease—a large volume would not sufficiently expose the evils which they have been the causes of. But these medicines have been sometimes known, in cases of a slight lax, unaccompanied with fever, to bring about a cure; and likewise in some old cases, after all the feverish, and inflammatory symptoms are

gone, they have been used with propriety. However, as it happens with many people; to get a name for the disease, and the name of a remedy which has succeeded in a disease of the same name this is all they want—they then prescribe at random, regardless of the present symptoms, or the patient's habit of body; and many other things, which a prudent physician finds of the greatest consequence, in directing him to a successful method of practice. But as the study of medicine does not universally confer sagacity, we cannot expect that others in general, should be much wiser, in that respect. So that it often happens when some very officious persons go to visit their neighbours, perhaps in the beginning, or height of a true dysentery, and they have heard of some medicines of the foregoing class succeeding in an obstinate dysentery, after many other things had been tried in vain, and consequently the disease well over; they will not hesitate to prescribe the same things in the height, or accession of the disease. Which if they do not cause death, excruciating pains of the intestines will succeed. We wish it was in our power, to clear all those who live by the practice of medicine, of falling into the same errors—but it is on some occasions too obvious, to attempt to draw a veil over it, especially among children, with whom this disease is epidemic every summer, in all the large towns of the United States. So that of those who die under three years of age, one half die of diseases of the intestines alone—and next to infectious fevers, they merit the most accurate investigation, both in children and grown person.

It is many years since we first observed, that opiates, rhubarb, astringents, or bark, when given in the increase, or height of dysenteries, always rendered the disease worse, the pain more severe, and heightened the fever after their use—the same may be asserted of wine, spirits, or cordials. They are therefore in these stages of the complaint to be avoided, as pernicious.

Therefore, in the accession, and height of the disease, there is no mode of treatment preferable to promoting a perspiration, by giving antimonials in the evening, particularly the antimonial powder, with warm diluting

drinks ; as water-gruel, barley, or rice-water, whey, warm milk, &c. and keeping warm in bed, in order to promote a perspiration. For the consent between the first passages, as the stomach ; and intestines, and the skin, is so great, that a diaphoresis generally eases their complaints at once.

It was formerly supposed, that the irritation, and inflammation, in this disease, began in the stomach, and extended down the intestines to the fundament ; and there generally appears to be some reason for this idea. For the stomach is generally affected, most at the beginning ; and afterwards, there is apt to be great irritation about the rectum, which is sometimes communicated to the neck of the bladder, causing a troublesome tenesmus ; or frequent and fruitless inclinations to go to stool—and in the neck of the bladder, a dysflury, and frequent inclination to make water, on account of the vicinity and sympathy of the neck of the bladder with the rectum. There is nothing gives more effectual relief in these cases, than oily and mucillaginous injections ; to which may sometimes be added, a drachm or two of laudanum. Warm fomentations to the abdomen, are of great use, in cases of great internal pains of the bowels, or even fomentation to the feet, or semicupium, by making the patient sit in a tub of warm water, as it is a powerful antispasmodiac, and allays morbid irritability. We have known excoriations, and troublesome smarting pains about the fundament, caused by the frequency, and acrimony of the discharge, very much relieved by the external use of laudanum on lint, or linen rag, frequently repeated—some, or all of these, may be necessary occasionally.

If the dyslenteria has been properly treated in the beginning, it is seldom dangerous or difficult of cure ; ever since we became well acquainted with the improved mode of treatment, we have always considered it, as a very tractable disease ; and we have seen it in the different quarters of the world. But the worst species of it which we have ever seen, was on the west coast of Sumutra, in the year 1784—5, being my first voyage to the East Indies, in the Royal Charlotte ; it was the first severe disease which attacked myself in India, having then but little practical

knowledge of it. We found the elementary instruction which we had received, and the modes of practice which we had seen; and the most approved practical authors, then extant, to my grief still deficient; it was therefore found there was much want of further improvement, in the manner of treating this destructive malady. Dr. Clark had about fourteen years before that, published his book on the diseases of Europeans in hot climates. But although it was an improvement upon any that had been known before; especially on dysenteries and remittent fevers, we found there was much room for improvement left, by this respectable writer, on the diseases of India voyages—in the treatment of these diseases, and much more in that of hepatitis: a disease which he passes over very slightly.—Therefore a knowledge of the animal economy, and of the operations of medicines, are very necessary in making the best use of his works, as well as those of many others—for the better any one is acquainted with the preliminary, and auxiliary parts of medical science, they are the better qualified to reap advantage from practical authors; as well as from their own observations in practice.

Towards the decline of the flux, the treatment may be very different from what is requisite in the foregoing stages—the bark, and wine may then be used to advantage. And opiates, especially dovars powder, may answer well, if no violent pains of the bowels, or tenesmus troubles the patient, rhubarb may then be a very proper purgative, to clear out the intestinal canal. And also by its astringent, and strengthening properties, it helps to put a stop to the frequent evacuations, which often remain long after the violence of the disease is overcome; in the same manner as a discharge from any of the mucous membranes, remains long after the irritation which produced it is gone; as we frequently see happens in the discharge from the nose, after having got a cold, or of the urethra, from gonorrheas. There has sometimes been such quantities of coagulated lymph discharged, in the form of membranes, in the early stages of fluxes, and in the same shape of the intestines which they lined, that they have sometimes been supposed it to have been portions of the intestines



themselves, but that never is the case ; neither are they so often ulcerated as has formerly been imagined, though they sometimes are.

This disease has sometimes been met with in a chronic form ; but from my having seldom known it run out to a great length of time, when properly treated, we believe it is a case which seldom occurs, and when it does, we believe that it is generally accompanied with some other disease of the abdominal viscera, as schirrous liver ; indurations of the mesenteric glands, or pancreas. But whatever be the real cause of it—there is nothing oftener succeeds in these obstinate cases, than calomel, in small and repeated doses. When treating of the hepatitis, we have considered the use, and abuse of mercurials in that disease. This we consider as indispensably necessary, and because of the great dependance which has been put upon it in that disease—it has been too indiscriminately, and improperly ventured upon, in this also. It is one of those edge tools of medicine which never should be handled, unless with the greatest caution, even by those who are well acquainted with its operations, and the effects which it and other powerful medicines produce on the human body.

The summer disease of children, whether they appear in the form of cholera's, diarrheas, or dysenteries, are very alarming affections, in all the large sea-port towns of the United States, in the summer. And from the repeated destruction which they cause among children yearly ; they merit the greatest attention, and the most serious investigation of medical gentlemen ; and the more so as they are often invincible by all their efforts.

These diseases commonly first appear, when the summer heats have arrived at their greatest height, in June and July, and continue more or less violent until September ; and are commonly in proportion to the heat, and moisture of the weather ; being worst in those years when there are great, and long continued heats, accompanied with frequent rains, and moisture of the air, the nights being cold. Children are always seized with these diseases, earlier in the season than adults, owing to the great-

er weakness, and irritability of their habits. They are on this account more susceptible of impressions from without, by the coldness of the evenings, succeeding warm days, &c. the obstruction of perspiration, from exposure to the evening, or morning air, and moisture, which affects the stomach, and intestines, by sympathy with the skin.—And probably the drinking of cold water, may affect their delicate frames in the hot weather—a defect of pure country air, appears to be a principal cause, as children in the country are seldom ever affected in the same manner.

The heat is known to be much greater in towns, than in the country, and the air less pure; and children are apt to get less exercise, and to become more delicate, and sensible of impressions, from food, drink, or air. And the custom so prevalent, of sitting out of doors, exposed to the evening air, may be a very common cause of this disease with children; for then after the heat of the day, perhaps falling asleep in their nurse's arms, must cause a torpor of the skin, and absorbents, all over the body, and cause a slight feverish state; and the stomach being always liable to sympathize with the skin, must in consequence thereof be first affected, and become irritable. And the intestines, next are affected, from their sympathy with the skin and stomach; and from the intestines, the biliary ducts are readily affected in the same manner. And hence the large secretions of bile, which, added to the irritable state of the stomach, and intestines, causes the sudden vomitings, and diarrheas—which, when it comes on suddenly, and with great violence, is in fact a cholera, causing both vomiting, and purging. By the stomach and intestines being both in violent action at the same time, and the redundancy of bile promoting it, by getting into them both in too great quantities; this state is accompanied with a feverishness, and quick pulse. In this variety of the complaint, warm diluent drinks should be used, frequently: as water gruel, fresh broth, barley water, or warm milk, and warm bathing at first, with small doses of castor oil in the morning, and a grain or two of antimonial powder, at night; and when the dis-

ease is obstinate and violent, small doses of opiates may be frequently repeated, giving next morning a drachm or two of rochel salts. The warm bath is very proper, or warm fomentations to the belly, and keeping the skin warm by lying in bed to promote a perspiration.

But in case the disease should not assume these violent symptoms at first, but appears in the form of a common diarrhea, or dysentery, with feverishness, it is to be treated in a different manner. As it should likewise after the appearance of cholera is over, if a purging should remain, with griping pains of the bowels, and feverishness, then it should be treated as a dysentery, with febrifuge medicines and regimen, taking care to avoid opiates, rhubarb, or astringents, while these symptoms are present; for they would aggravate the disease, by pening up the offending matter in the bowels, and raising the symptoms higher, &c. If the disease of the intestines appears only in the form of a simple purging, or, having been attended with the other symptoms before enumerated, and they are gone off, then rhubarb may be admissible, with magnesia, especially if there are any symptoms of acid abounding in the first passages, as is often the case with children, at any time of the year; and a drop or two of laudanum may be used, if it continues obstinate. But we must again caution the prescriber to be very cautious in the use of either of these remedies. But when children are under this genus of affection in their intestines in the summer, or autumnal seasons, they very often degenerate into true dysenteries, either with or without sanious discharges. But the disease is often as bad, either in adults or children, when the discharge is only of a white mucous appearance, as when tinged with blood or serum; for the mucus is often discharged from the inflamed surface of the intestines, and indicates an inflammation to be present, as certainly as when serum is exuded from them: although the serous or bloody appearance shews it to be farther advanced, and to affect the small blood-vessels of the intestines, either of the arteries, or veins. This stage of the complaint, is generally accompanied with a feverishness, and great pains of the bowels, and often with a tenesmus; and these are in

every case, the most proper characteristic symptoms of a dysentery, and serves to distinguish it from a diarrhea, in particular, in every age and sex. It is at present a practice, but over common with some descriptions of persons, in these cases, to have recourse to astringents, and opiates, in the dysenteries of children. Some think the pains, &c. are caused by worms, because perhaps they have seen some discharged; and others regardless of the symptoms of fever, or pain, thinking if they can stop the flux, that all will be well; have immediate recourse to the strongest astringents, and opiates, and according to a common phrase, shut the door with the thief inside, ignorant, or regardless of the bad consequences of such proceedings, which they must often perceive.

The mode which we have seldom ever found to fail, if applied to in these cases in time, that is before the inflammation was raised to a great height, or a mortification of the intestines had taken place, is in general as follows: if there is not much irritation at the stomach, a gentle emetic may be given at first, keeping the child in bed after it, supplied with warm drinks, in order to promote a perspiration, and one or two grains of the antimonial powder, every night whilst any feverishness remains, and repeated once or twice a day, and every second day, a little castor oil, occasionally, or a small dose of sal. rochel; and if there is much straining attending their evacuations, injections are useful, for the tenesmus, and the warm bath, warm fomentations, and warm drinks, and promoting a perspiration by lying in bed.

This is the method of treatment which we found most successful, in the dysenteries of children; but particular indications must be obviated by particular remedies. When an acid appears in their stomachs, magnesia, particularly the calcined, is the most safe, and effectual absorbent to neutralize it—this preparation being about double the strength of the common magnesia, half the weight will be a full dose; it is naturally a mild medicine. This preparation also has a tendency to absorb the air, which being extricated in the first passages of weakly children, often causes cholicky pains, by being pent up in the bow-



els; but we must caution against the too common use of rhubarb with it, although often given together; for in the beginning and height of the disease in children, it is attended with all the bad consequences in them, that it is in grown persons. And likewise the cautions against opiates, and astringents, are fully as necessary, or more so, with respect to children than to adults; as their tender organs are so very susceptible of all impressions, that it is scarce possible to be over cautious, in the use of any of these articles with respect to them. Although many well thinking matrons, misled by bad authorities, in these cases, sacrifice the lives of many poor children every year: for their physical reasoning stops at the surface, not knowing enough of the nature of the diseases and remedies, by an ill directed kindness, in making over free with medicines and constitutions, which all their practice cannot teach them to understand sufficiently; but we must excuse them as far as possible in these mistakes, as good guides in these matters, have been very scarce.

It is a practice too common with nurses, when children are taken with pains in their bowels, their feelings of which they express by crying, and drawing their knees up towards their bellies, to immediately have recourse to some infallible nostrums; which are commonly sold ready prepared by apothecaries, under the names of cordials, confections, elixirs, tinctures, &c. in which opium, and stimulant substances are always the principal ingredients: in some cases these cordials and carminatives, expel air from the intestines, and the opium, when a child is worn out with pain and crying, causes sleep; but at the same time, there are scarce any other two substances in the whole materia medica, of more dangerous consequences in these cases; for the stimulant substances are certain to cause inflammation, if there is any disposition to it present; and at the same time, the opium lulls them into a deceitful kind of forced rest, and shuts up the offending acrimony in their intestines, the consequence of which is so often pernicious. There are other methods, by which we might come more safely, and certainly, to our pur-

pose ; which, although it may be a little longer in giving immediate relief, it will not cause death.

The analogy of this species of diseases in adults, may be frequently applied to those of children, as whatever is either useful, or hurtful in the one, must generally be so in the other, in some degree ; therefore a careful perusal of what is said already on this subject, is advised with respect to the summer diseases of children, making all due allowance for the difference of age, strength, irritability, &c.

As we cannot find out by inquiry, the diseases of children, otherwise than by their cries, and the drawing up of their thighs, and knees to their bellies, when they are in violent pain ; unless there is much irritability present, the most safe and speedy relief, will be obtained by giving a gentle emetic of a few drops of a solution of tartar emetic, or two or three grains of ipecacuanha, or the tincture of it in wine ; a dram of tartar emetic may be dissolved in an ounce of water, and then eight or ten drops of it will contain a grain of the powder. This might be kept ready prepared in families ; but it has some inconveniences, as it ruffles the constitution, and a frequent use of it weakens the stomach. But castor-oil, or oil of almonds or olives are not subject to any of these inconveniences. In case children can be brought to swallow them, there is no other purgative more proper for them, especially where they are very irritable, for these oils open their bowels gently, and expel the acrid matter from them ; and soothe and allay pain and morbid irritation, and even appear to possess anodyne, or sedative powers ; after the purgative operation is over ; and never constrict, or leave a costiveness behind, or griping pain, like rhubarb. The oil may be given to children mixed with sugar, molasses, or powder of liquorice—in these ways it may be easily taken by them. The pernicious custom of giving spiritous cordials to children when the pains of their bowels are urgent ; which are so apt to cause weakness, scirrhus livers, and deprave all the animal function in grown persons ; will beyond all doubt, be fol-

lowed with as bad consequences in infants, in whose stomachs nature shews us, that even a substance so mild as milk, is ordinarily stimulant enough for their common food, even in health. Sometime past, having been consulted for a child of eighteen months old, in a very bad dysentery, which had been of seven days duration; the child had been in violent pain, accompanied with frequent evacuations, and the fever high, and the patient worn out and restless, wishing to know how it had been treated? They shewed me two vials, in one of which there was essential oil of cassia; in the other there was a solution of allum with laudanum, to answer the double purpose of stopping the purging and the pain; but unfortunately for the poor child, neither of these intentions were answered: whilst the fever and inflammation, which run very high, were totally neglected. As the case appeared desperate, a mortification of the intestines was doubted; and a different plan of treatment was therefore ordered; small doses of the antimonial powder, every six or eight hours, with warm drinks and warmth of bed, and a warm bath was ordered to be used once or twice in twenty four hours. What was remarkable, ever from this was begun, the violent pain and fever abated; but the disease had been too far gone before; and the child departed the second day, without any more violent fever, or pain, which shewed that the intestines must have been in a gangrenous state before; or otherwise the pain would not have disappeared so very suddenly, and not returned.

We have sometimes observed young children, two or three days after their births, attacked with a species of cholera, from the retention of the meconium; which in these cases appears to cause violent irritation, and frequent evacuations, both upwards and downwards, accompanied with the appearance of violent pain. For this affection we have found nothing more efficacious than warm baths, and a tea-spoonful of oil of almonds occasionally; and keeping the little patients warm—the oil given in time, in order to evacuate the meconium, commonly prevents this accident.

The lientery, or that affection of the stomach and intestines, wherein the food and drink appears to be discharged by stool, soon after it is taken, appears to be caused by a weak irritable state of the stomach and intestines, accompanied with laxity and mobility. This state of the alimentary canal sometimes succeeds obstinate diarrheas, or dysenteries, as we have on some occasions observed. But we believe it is seldom a primary disease, or unconnected with one or the other of these; after their painful, and inflammatory stages are gone off; and the intestines are left in a weak and over sensible state; they are easily irritated by their contents, from having lost their natural mucous lining, by the preceding disease: their undefended interior coats being exposed to whatever is passing through them. This complaint commonly goes under the name of the primary disease, which it succeeds; and in reality, it appears to be only a variation or symptom succeeding to them—but here as in other diseases, the first consideration is to find out the cause of the malady, and its mode of action upon the body; and then we may have some hopes of applying a rational method of cure—but whatever is attempted without this knowledge, is evidently empiricism.

In this disease any thing taken into the stomach, either food, or drink, gives a stimulus to it; which is continued down through the whole length of the alimentary canal; and by this means promotes the sudden evacuation of their contents, by the stimulus given by that which follows, and this last remains until it is protruded by the next succeeding, and so on.

From this account of the cause of the lientery; we would naturally conclude, that mucillaginous food, such as soups, jellies, sago, and tapioca, &c. are the most proper; they being both nourishing, and having a tendency to supply the intestines with their natural mucous covering, and do not cause any great degree of irritation of the stomach; strengtheners, may be used at the same time, to restore the natural tone of the parts; as chalybeats, bark in decoction: for the powder causes an increased irritation sometimes in these cases. In diseases of this genus



opiates may be used to allay the irritability of the intestines; astringents, likewise, may here be given with safety, and advantage; and in case any purgative may be thought necessary, in order to evacuate the contents of the intestines, and leave an astringency after it, rhubarb answers very well. For after its operation is over, by its astringency, the intestines get time and opportunity to recover their former strength.

The cholera morbus being a sudden, and violent affection of the stomach, and intestines, accompanied with vomiting, and purging; it is one of the most acute, and rapid in its progress, of all those diseases which attack the human body; and sooner reduces it than any other known at present, from a strong, to a weakly condition. The cholera is most frequently caused by getting cold suddenly, after the body has been over-heated; by the cold suddenly constringing the external vessels, and rendering them torpid. Also sudden emotions of the mind, such as terror, or frights are active causes of it; for the fluids are caused to rush inwards upon the interior vessels, where the warmth is at all times nearly equal—and the vital energy is directed to these parts also, as it is repressed externally, &c. and causes a temporary inflammation; or gives an extraordinary stimulus to the parts; and the action of the interior vessels is increased; and in consequence of this, the vessels of the liver, being the most lax, and weak, in proportion to their capacity, will be distended with blood, as it returns from the intestines; and this of consequence stimulating the liver, a greater quantity of bile will be secreted. Besides the blood-vessels of the intestines being likewise distended, they assume an inflammatory state, from the overcharge; the liver is irritated, by consent with the other parts—and by that means stimulated by the branching, of these vessels through its substance. This disease happens most frequently in the latter end of summer, or autumn, when the weather is variable, with cold nights succeeding hot days.

We cannot conceive that fruit could in any other manner cause a cholera, than by their roughness, and acidity, stimulating the intestinal canal. In this manner they of-

ten cause a gentle lax—but the predisponent causes in this disease, appears to be the preceding heat of the summer, by which the external surface is relaxed, and the habit of body weakened, and rendered more susceptible of the effects of impressions from without. So that whenever cold is suddenly applied to the exterior surface, whilst in this state, it acts with great force on the intestines, so that they are thrown into alternate convulsions, returning at short intervals, and discharging their contents, both upwards and downwards.

From what is said of the cholera, we should be partly instructed in the method of cure. The patient should be plentifully supplied with warm diluent drinks, as water gruel, rice, or barley water, &c. and warm bathing, often repeated, and small quantities of opiates, may be interposed at intervals, to allay the irritability of the system, and the commotion of the bowels. But as the interior parts are commonly overcharged with blood from the irritation, bleeding is generally necessary at the beginning; and external warmth, by clothes wrung out of warm water, and applied to the pit of the stomach, with the saline draughts, &c. to allay the irritability.

When a purging comes without fever, and no violent pains in the bowels; it is only a diarrhea, and requires a different treatment from the dysentery; it is very seldom dangerous whilst it keeps this appearance—but sometimes a dysentery begins also, in this manner; and then it merits more serious consideration, especially if it appears at a time, and place, at which the disease is prevalent, for then it must be treated with more caution than common, lest it should degenerate into a dysentery; which, also, in its decline puts on the appearance of a simple diarrhea; here it may admit of a different treatment, such as is recommended in the latter stages of the dysentery. There are some varieties of this disease so mild, as to bear being treated at their beginning, with rhubarb, and preparations of opium, and astringents—but before any of these are used, we should be very certain of the innocent nature of the affection, otherwise they may be of the most dangerous consequence, by shutting

up the offending matter within, and thereby increasing the irritation, and consequent inflammation; and all the bad symptoms of the disease. The best manner we believe, in which a simple diarrhea can be treated, is by such substances as first evacuate the intestines, and afterwards leave an astringency behind; of this nature is rhubarb—and small quantities of ipecacuanha, and even sea-water, has the same astringent properties, after its purgative operation is over; this is well known to most seamen, and others, who sometimes use it. We have tried the experiment, in slight cases of diarrhea; and it succeeded effectually. And as a simple diarrhea is to be distinguished from a dysentery, or bloody flux, by the absence of fever, violent pain, and tenesmus, or irritation, about the fundament, with frequent, but fruitless strainings. These three last symptoms are the most distinct marks of the dysentery. But between the genuine diarrhea, and the dysentery, there are every possible intermediate variation; although in warm climates, the one commonly precedes the other, as we have repeatedly witnessed. In the same manner as the different varieties of fevers are intermixed, so are the diseases of the intestines, which we have described in this account of them; so that rather than attempt the labour, of describing every possible variety, which evidently would be a work without end; it may answer better to delineate the commonly received division, as accurately as it is in our power; and also to compare their relation to each other. For as there are real causes for all the varieties of these affections, whenever we can trace them out; so are there also in these which exceed our comprehension.

In a simple diarrhea, or lientery, rhubarb is a very useful medicine, as it clears out the intestines, and carries off the putrid saburra; and by its astringent properties, strengthens the intestines against the disease. This is by no means an inactive, or useless drug; but like all other good medicines, it is very liable to be abused, by being misapplied; and it is altogether as capable of doing hurt, as of doing good—its effects depend upon the times of its application; for in case there are any feverishness,

or inflammation present, it shuts up the offending matter in the intestines, and increases the disease. We have long since observed the effects of rhubarb, in our own practice, and upon inquiring into the subject, we find the same observation has been made by several others: as Dr. G. Baker, Dr. Mosely, and Zimmerman adopts this opinion of it, in the latter part of his book; although he used it freely in the epidemic dysentery, he describes, at the beginning of it. He, like all the others probably had seen the bad effects of it, and learned caution by experience. We were led to this first by observing almost every one to whom we gave rhubarb, complaining the next day of violent pains in the bowels; the griping, and uneasiness, being always much increased by it. Rhubarb was first introduced into practice, as a strengthener in the dysentery, by Alexander Trallian: but not as a purgative.—For astringents and strengtheners, were then, and long since looked on as the most efficacious medicines in this disease, and also in diarrheas—but as we are now well aware, that when given in the inflammatory state of either; it is a very pernicious remedy, as may appear very evident by its stimulant, and astringent powers, acting upon the intestines, when they are already in an inflammatory state, and afterwards confining, or shutting up the matter, which should be evacuated: thus stimulating the intestines more violently—this is its common effect, when used indiscriminately, by that description of persons, whom nature never designed, or qualified to judge, or act for themselves: nor to discriminate the different symptoms, and indications in diseases, and the effects of medicines upon them in particular, and upon the human body in general. But in this respect rhubarb is not singular, as every other article is misused in the same manner. But the same properties which renders it hurtful in the inflammatory stages of these affections, renders it useful after that is gone; for then the strengthening, and astringent properties, it is possessed of, helps to strengthen, and recover the tone of the intestines, obviating the lax, and preventing the frequent calls to evacuate. For it always leaves an astringency after its ope-



ration is over; but in the slighter varieties of diarrheas, which are not accompanied with feverish, or inflammatory symptoms, it may be very well adapted to them, even at the beginning; but when it is ventured on, its effects should be closely observed, lest it should do hurt.

Opium bark, and all other astringents, and anodynes, are applicable where rhubarb is admissible. But where any of these are used, their effects also, should be closely scrutinized, that they may not increase any feverish, or inflammatory symptoms, or aggravate the griping pains, or tenesmus, after their operations are over. Alexander of Tralle, is also the first we can find, who remarked the bad effects of opium, and its compositions in the early stages of the dysentery. He says it deceived those who used it, by the patients sleeping all night; and the frequency of the flux being stopped for the time; but the next day they always found the relief fallacious, and the disease worse than before; for the humours being collected, were then expelled without intermission; with a heaviness of the head, loss of strength, and an increase of the flux. And upon all these accounts, he thought opiates should not be given without great necessity—nevertheless it is my firm belief, that even opium, notwithstanding all these pernicious effects, and many more not yet taken notice of, is less hurtful, in the increase or height of true dysenteries, than astringents, and strengtheners, as they have too often been used hitherto. For a list of astringents, as extensive as nature herself, have been imprudently used in this disease; but although the class is very numerous, yet there are scarce one of them which has not been extolled as infallible, at one time or other; but without pointing out the times, and circumstances, under which they are useful—Some of the bad properties of opiates are obviated by their general effects, as they remove spasmodiac strictures of the extreme vessels, and thereby render them permeable. And it is also a prevalent opinion that they thin the blood, and thereby render it more fit to pass through the vessels—they also generally promote the perspiration; and increase the circulation towards the surface of the body; and on these

accounts, opiates are rather less hurtful than astringents are in this disease.

Here is a case of the dysentery, which was treated in the old method: wherein the bad effects of the premature use of rhubarb, ipecacuanha, and opiates, are very evident. This was in my first voyage, when there were several others; where the treatment and success were the same—being myself under this disease at the same time.

The Royal Charlotte, in Bencoolen Roads, December the 20th, 1784. The weather was warm and rainy, with frequent thunder and lightning. Mr. Radford, midshipman, aged eighteen years, had been in the West-Indies, before. He was of a thin, active constitution—before he applied for medicines, he had a purging, with pains of his bowels, for ten days; but being unable to do duty any longer, he applied for assistance—he had a purgative of the glauber salts, and barley water for his common drink—21st, the purging continued, but the griping was abated; he then had powders composed of rhubarb three grains, and ipecacuanha, one grain, every three hours.—23d, he appeared somewhat better, the purging abated; he continued the same powders, and he had an anodyne at night.—25th, the purging was more violent, with sickness at stomach. Now he had an emetic, and the anodyne at night—26th, he was much the same; he now had antimonial powders, and the anodyne at night—27th, the purging and griping continued very violent; he now had bolusses, of one scruple, of philonium, rhubarb two grains, and ipecacuanha, one grain, thrice a day—28th, the purging was worse, and his pulse was quick, and small, and his strength very much exhausted; he had no rest in the night; the bolusses were repeated as before, he had Port-wine, to use in his barley water.—29th, the purging and griping the same; he had no appetite for any thing, but barley water, and water gruel; now he was ordered a decoction of the Peruvian bark, with Port wine. 30th, he complained of great heat, and pain of the rectum; his pulse was small and quick; he had an injection, with laudanum, and one powder as before, and an anodyne at night. 31st, he was seized in the night with a violent

pain, and hardness in the lower part of the belly; he now had an infusion of Senna, salts, and manna—this first vomitted and afterwards purged him; the discharge was black and offensive.

January 1st, 1785. He had a restless night; the pain and hardness of the lower belly returned; bladders filled with warm water were applied to the part, which gave him some relief; and the tenesmus, as before was severe, with very frequent evacuations; he had two injections this day: likewise catechu, or earth of Japan, ten grains, and philonium, one scruple, this eased him for the present: but before mid-night the pain returned with great violence, and then he had a blister applied to the part—2d, he was very restless in the night, and faltered in his speech, with frequent sanious discharges; the injection was repeated, and the decoction of bark, &c. 3d, all the symptoms were worse, involuntary sanious discharges, of a very offensive putrid smell; his pulse was irregular, with a starting of the tendons; he had the decoction of bark, with wine, and an anodyne at night. 4th, this morning he had lost the power of swallowing, and at noon he departed.

Remarks. Here we see the disease approached very gradually; and this is the common manner in which we have always seen it proceed. The progress of the disease, and the advances of death were as regular, as any one could expect, although it was a very bad case of the flux; but the treatment was injudicious; though some indications were obviated, by proper remedies: yet the exhibition of opiates so early, and so constantly at night, was improper, and the more of them were used, we see the worse were the symptoms which followed. The rhubarb and ipecacuanha, were also used prematurely; and their bad effect from their astringency soon followed. Had this young man been treated in a different manner, he might have recovered: first, by an emetic, repeated occasionally, and then the castor oil, or the neutral salts, in order to have cleared the intestines of their acrid contents, with antimonials every night, in place of opiates; unless when the pain, and want of rest was very distressing; and anti-

monials on the intermediate days. And sometimes an ounce of castor oil, in place of the neutral salts, when the griping pains were severe; and when the feverish symptoms were overcome, and the patient left weak, with a frequent lax: then rhubarb might have been used to advantage, and likewise ipecacuanha, in case there were no tenesmus: as it often causes, or aggravates this troublesome symptom—and in order to restore the strength, bark in infusion, or decoction, may be the best manner of giving it, because when the intestines are very susceptible from the disease, powders of any sort, are apt to stimulate too much; and are therefore improper.

There is nothing in my opinion, can set an improper method of procedure in a stronger light, than thus pointing out the rocks on which others have perished; and as such modes of treatment were lately, and are yet followed by many—we consider it a duty we owe to society, to advertise them of their danger; especially as we can recommend a successful practice, which is very different. We could give several other cases of a similar nature and method of treatment; in some of which calomel was used prematurely, upon a supposition that the disease was complicated with obstructions, &c. in the liver, or other abdominal viscera. But we can give full testimony against mercurials, in this disease, unless in cases of long standing; and this from ample experience of its pernicious effects, we should not have thought necessary to even have mentioned this, did we not know, that some physicians, of some degree of popularity, recommend it rather indiscriminately, in this, as well as other diseases.

In confirmation of the practice here recommended, we can affirm that we have followed it these last fifteen years, in all ages, and sexes, in the different parts, in which we have practised, and uniformly with the greatest success; scarcely ever losing one, unless where there was some local disease in the viscera. Ever since we acquired a rational knowledge of the disease, and of the operations produced by remedies, we have had sufficient reason to conclude this, to be one of the most tractable of diseases, and always a good symptom in other diseases, if unattended



with a hectic state of the pulse, in which it is always fatal.

July 10, 1790.—John Tucker, ordinary seaman, aged 19 years, never at sea before, of a tender constitution, was taken with a pain in his bowels, a nausea and sickness of his stomach; he first had an antimonial, which was repeated at bed-time.—11. He was much the same; he had now glauber's salts one ounce, and the antimonial to be taken at night, as before.—12. The griping and purging, were much abated; but he complained of feverishness, and head-ache; tongue dry and furred, pulse quick; went on with the antimonials, with warm drinks, with directions to keep warm in bed.—13. Gripings were troublesome; he had castor oil one ounce, and the antimonial at night.—15. The pain of his intestines returned; he had a few drops of laudanum added to his antimonial at night.—16. He was much better, but weak; he had a little powder of bark with the tincture, and at night an antimonial, with some drops of laudanum.—17. He had a return of the pains of his bowels, &c. he had castor oil repeated, and at night the antimonial and opiate, &c.—18. He appeared to be tolerably free of the feverishness, but the purging continued; he now had rhubarb one scruple—it caused no pains after its use, all the inflammatory and feverish symptoms being gone before this time.—19. He recovered his health gradually, using a little bark, and wine and water for common drink; but at the height of the disease, warm rice water, to keep up a perspiration, was paid particular attention to. From this he had no more any remarkable symptom, but recovered in a few days.

Here there was a different method of cure followed, from that of the former case, and with different success. Here we abstained from rhubarb, ipecacuanha, bark, or opium, until the intestines were well cleared, and the feverishness overcome, by its appropriate medicines; and then these strengtheners and astringents were very proper, in order to carry off the remaining lax of the intestines; but had these been used early, this might have been a mortal case, as well as some others which we have

formerly seen treated in that manner. We can with the more confidence recommend this method of treating the dysentery, because we have always met with the greatest success in following it, both at sea and on shore, in warm and temperate climates, in Asia and America, with little variation in the mode of treatment; and in children, as also in females, and adult males, we can only remark that the disease is in general much milder, and more tractable in N. America, than in the East Indies; but this is only what we would expect, in all the diseases of warm weather; that the more temperate the climate, the more mild and tractable will the diseases be; and on the contrary the more warm the country is, the more violent may we expect the diseases of the warm season to be. Infectious diseases appear to make an exception to this general rule; for they are more frequent in the temperate countries, when generated either in fevers, or fluxes. Infection always renders them more dangerous, and obscure in their proceedings, and they are very apt to prove mortal sooner than we would expect from the appearances.

We attended a young woman within these twelve months past, who was taken with a very violent flux. She had been some days very bad before applied to. She was in a very great fever, with frequent bloody evacuations; her tongue was furred of a brownish colour, and her pulse 120 in a minute; as she had no appetite, and her stomach appeared to be loaded, she had an emetic of two grains of emetic tartar, and an antimonial powder at bedtime, and the next morning half an ounce of rochel salts. After this, the griping pains which had hitherto been very severe, were easier, and at night again, the antimonial powder was repeated. She had constantly warm drinks, and sometimes sago with a little wine and sugar to eat, and ordered to keep constantly well covered with the bed-clothes, although in warm weather; for most people are too careless of this. The third day after seeing her first in the disease, the fever was still high, and her tongue foul, her pulse quick and small, and her skin dry; this day she had three, or four of the antimonial powders, of about five grains in each, which was as much as she could

conveniently bear on her stomach, with warm drinks; and was prevailed on to keep a blanket over her, for hitherto she only kept a sheet on her; some little perspiration began to appear, with a softness of the skin; but the griping pains continued. Next day she had an ounce of castor oil, which gave great relief from the pain, and at night an antimonial powder. Hitherto she had rested but very little in the nights, from the frequent calls to get up, and getting cold in that manner, from staying too long in the necessity at once—a very common custom with those who are bad in this disease. But from this her pains almost totally left her, as if by a miracle, and she slept and slumbered day and night, for three days and nights successively, with very few calls to get up, and scarce ever asking even for drink. This remarkable relief was the more wonderful, as she had no opiates from the beginning of the disease. By the suddenness of the change of the disease, we were not without some fears, that a mortification had taken place in the intestines; but the ease was obtained by the irritation being lessened, and its causes being carried off. The second day of this rest, she had another dose of castor oil, and the third some more of the antimonial; and as the fever and violent pain was now gone, rhubarb and bark finished the treatment successfully.

It is very difficult to foretell at what time of the disease, either rhubarb, opiates or bark may be safe; they never can be given with any degree of safety, until the patient is entirely free of all inflammatory symptoms; and if any of these have been given prematurely, and found to disagree with the patient, they must be immediately left off, and a little castor oil given, in order to prevent any bad consequences from taking place: as for astringents, they are very seldom necessary; we believe it would be much better to never use them in this disease; for if the treatment has been otherwise proper, in the accession, and height of the disease, they will not be necessary, for the flux will commonly cease gradually without them; and in case the disease has been otherwise improperly treated, they will be so far from remedying, that they will add to

the evil; so that it would be much better they were proscribed entirely in this disease. For even in the chronic lax, or lientery, which follows in consequence of improper treatment, in the early periods of the malady; the only state when astringents are even safely given, their use is seldom attended with success. Here rhubarb comes in its proper place as a strengthener, and also bark and chalybeats, and a moderate use of good port wine, with a pure air, and gentle exercise. But we must, as much as possible, prevent any obstructions from taking place in the viscera of the belly, by these means; but in case we have sufficient reasons to suspect that any such obstructions have taken place, from the obstinacy of the disease, or by swellings of the feet, or of the lower belly, then small doses of a grain or two of calomel, repeated every two or three days, in a pill, will answer very well for this purpose. Obstructions of this nature are very apt to form in the mesenteric glands, when a patient is much reduced either by this disease, or by fevers; and when this is the case, they obstruct the course of the chyle, which passes off by the intestines, and causes the variety of disease known by the name of a mesenteric flux. When this is the state, the patients, although they sometimes have a tolerable good appetite, and take food in moderate quantities, yet it can afford them but little, or no nourishment, and therefore they continue long weak, and meagre: here calomel is the proper antidote, by its stimulus, it removes these obstructions in the course of the lacteals, and bitters may be advantageously used at the same time, and likewise bark, &c.

The sympathy of motions which subsists so generally either in sickness or health, between the skin and the stomach, and intestines, is as visible in this disease, as in any other, or more so; for the most violent pains of the bowels are brought on by the exposure of the skin to cold, and they are as certainly alleviated, by keeping the skin warm, and promoting a perspiration, by warm drinks and antimonials. This is well exemplified by the ease, which so constantly follows a few hours of rest in the night, and warmth in bed; but we never yet had hopes of suc-



cels in the treatment of patients who were restless, tossing about, and would sit, or lay about any where, almost naked, even in the warmest weather, or those, who by their impatience or negligence toss the bed-clothes off them in the night ; for if such patients do recover, it is not owing to their own prudence ; but the strictest watch should be kept over them, and where reason and prudence prevails, they should be persuaded to be very careful in this respect. Heat where the air is pure, as before observed, is very seldom the immediate cause of any disease ; but cooling suddenly, is in general the cause of all the diseases attributed to heat ; therefore the principal object is to avoid suddenly cooling ; for in this consists the principal danger ; for a little variation when the body is much heated, operates very powerfully, by stopping the perspiration, and constringing the skin, which is communicated to the stomach, intestines, &c. and casting the fluid suddenly upon the interior viscera, and causing inflammation, fever or flux ; and as we know this to be the cause, the sympathy between the stomach and external skin, is very evident here, and the cure as we have pointed it out is more rational.

The choleras of children sometimes degenerate into dysenteries and are caused in the same manner as in adults, by getting cold ; from exposure to the night air, when predisposed to be affected in this manner : as they are in their second summer, by their beginning about this time, to use other food, which is harder of digestion, besides their milk. And about the same time, they are more liable to be troubled with worms ; and likewise their teeth are then most troublesome, causing an increased irritability. And all these causes are increased in towns, by the heats in the day time being so great, and the impurity of the air. We have seen enough of these diseases for some years past, to convince us, that any one who is well acquainted with the treatment of choleras, and dysenteries in grown people, will not be at much loss in the treatment of these diseases of children ; for they only require the proper allowances to be made, for the age and temperament, which any rational practitioner may soon inform himself of. Any reasona-

ble person may be easily persuaded, that this disease is only to be safely, and effectually treated in a rational manner, from a knowledge of the causes, and not by a routine mode of treatment; for it deserves the most serious investigation.

It is not so much the medicine, as in the time, and manner of administering it, which cures the disease. In this disease we have not recommended one new remedy. The works of others contain every thing, which they will find here, but the time and manner of using them is our great object. We did not want a long list of infallible remedies; particularly in this disease, and the ague—but a rational, and scientific method of treating any disease with a few medicines, well chosen and properly applied, is our aim, for the purposes mentioned here. There are several other substances of nearly equal efficacy; but to mention them would only cause confusion to the less informed, and those who are otherwise, will be able to vary the remedies at discretion. But the grand object to be pointed out, in the treatment of diseases, is the intention of cure, by giving a proper idea of the disease, and of the manner in which it affects the human body, so far as our discoveries have extended; and the rational method of obviating, and overcoming morbid actions, by medicines. We are aware that the treatment must necessarily be varied according to age, habit, sex, climate, or season; but the same general plan of cure must be kept sight of, in all situations—therefore we shall not say that this only, is the true method of treatment; as we expect it to be varied ad infinitum.

*Recapitulation.*—We may now make some additional remarks on the cholera: as this affection is so suddenly destructive, and in all cases so alarming, and dangerous. We have remarked that it is most commonly caused by the sudden application of cold, after the body has been much heated: getting wet particularly—a sudden fright, or any thing which causes much agitation of mind—also frequently act as exciting causes, when the body is predisposed to it. In this disease the sympathy between the skin, and the first passages, is seen in the strongest light.

The stricture of the skin is immediately followed by the affection of the stomach; and the intestines, and biliary ducts, immediately sympathize with it. The original cause of the disease is sometimes seated in the stomach, or intestines: such as crude, or indigestible fruit, rancid oily food, and such like substances, before the cold is applied. On the other hand, as the skin and its affections are very common causes of this, and other diseases of these parts, so it may also be used in their cures. The most certain, and powerful means of cure, of which we are possessed in choleras, and some other acute diseases of the first passages, are warm baths, and fomentations to the pit of the stomach—warm bathing may be applied to the whole body, or at least to the lower extremities; and a vapour bath may often be practicable where the immersion is not; there are various ways of applying it, as wrapping the patient up in a blanket, and placing him over a vessel of warm water; or heating stones, or bricks, and pouring water on them, and placing the patient over the steam.

Warm thin fluids should be used for drink, such as gruel of oatmeal, which is to be preferred, if convenient; to which may be added, a spoonful or two of wine to every pint, with a little sugar and nutmeg; weak chicken broth is also an excellent drink, it may be seasoned as the patient chooses; frequently drinking a little is apt to answer best, when the stomach is very irritable; and a piece of flannel or coarse cotton cloth wrung out of warm water, is a very efficacious application to the pit of the stomach, as it may be frequently removed without much inconvenience; a few drops of brandy have been thought to increase its efficacy: putting it on the flannel just before its application. As soon as a perspiration can be promoted, by such means as here recommended, the vomiting, and pain of the bowels will cease, or at least be much alleviated.

We have not yet mentioned laudanum; we are too well acquainted with its pernicious, as well as its salutary effects; to recommend it indiscriminately: a manner in which the use of it is much too general. In some very slight cases, it may be useful in small quantities, but it

should never be persisted in; for by its obstructing the motion of the intestines, it is frequently more hurtful than useful, and often it is a deleterious poison, in the diseases of the intestines.

Another mode of promoting the healthy action of the skin, and thereby of relieving the interior parts, is, by means of frictions: either with a flesh-brush, or a piece of coarse woollen cloth; but the body should be kept warm at the same time, and the chafing, which may be applied to all parts of the limbs and body, should be continued until a warmth is promoted—it answers best when performed under the bed-clothes; the patient at the same time, using warm drinks. Applications of this nature to the surface of the body, are also very useful in other diseases of the first passages, particularly in dysenteries—there is no other means which we have known so effectual, in removing the severe griping pains, and other symptoms which attend this disease. For always, when a warmth, and gentle perspiration of the skin can be promoted, the violence of the pain abates in a short time after.—Cholicky pains, are also often relieved in the same manner. Together with these external applications, the internal use of any bland-oil, such as that of almonds, or olives, or even castor oil, is excellent for allaying irritations of the first passages. The cholera, we should place among the highest degrees of irritation, in these parts: and a diarrhea as the least remove, from a healthy state—either may come on suddenly, from apparently slight causes at first. But it is remarkable that a dysentery, more commonly begins as a simple lax, or rather diarrheas appears to degenerate into dysenteries, very often; but choleras seldom ever do—although the most acute diseases of the first passages. Local affections of the glands of the mesentery, or of the liver, are sometimes causes of these affections, such as scirrhus swellings of these parts—hence the hepatic flux, &c.

The predisponent causes of these affections appear to be great irritability of the parts, when they are in that state, very slight causes may excite these diseases. It is common for seamen after long voyages, to warm



tries to eat great quantities of fruit. Whilst out at sea they have been confined to salt meat, and biscuit for some months; being used to a diet so uniform, the least change in their food is very apt to affect their first passages. We have known a piece of cucumber not larger than a nutmeg, cause violent griping pains, and slight choleras; in such situations, a simple lax often proceeds without any intermediate stage into a dysentery—this is the general manner in which they originate, in warm climates—Pringle and others, mention hardened excrements, stopping up, and irritating the intestines, as the manner in which the disease is produced; we do not deny the possibility of this, but we are certain it is a rare occurrence, even in temperate climates: and still more so in warm countries; Dr. Cullen has followed Pringle in this. Drinking large quantities of warm milk, chicken broth, gruel, or a jelly made of starch, answers well. A little cinnamon, sugar, and wine may be added, to any of them in order to render them agreeable. Of late a supposed discovery, of the virtues of lime-water added to milk, has been recommended in high terms of approbation; we do not doubt its utility, either with, or without lime-water—and where an acid acrimony prevails, the lime water may be very useful. All the absorbents, and vegetable alkali have been useful in light cases.

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## *Periodical and Continued*

# F E V E R S.

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### *Intermittents.*

THE physical nature of intermittent fevers, (or agues) has hitherto been an obscure subject; although these diseases are so very common in many parts of the world. They would to us appear to be the connecting medium between febrile, and spasmodiac diseases; for in their periodical returns, and their modes of acting, they would appear very much, to resemble spasmodiac affections, although they have always justly been classed with fevers; and often degenerate into those of a remittent nature. The stomach appears to be the part principally affected in these diseases; the head-aches, and pains of other parts, appear to be caused by their sympathizing with it. Cold and moisture, applied to the surface of the body, often causes sickness of the stomach. It appears to be the centre of the sympathetic affections, more than any other part of the human body. But besides these external causes, the eating of crude, acid, and indigestible substances, are very often causes of these affections: but it appears from circumstances, that there must be a predis-

position in the habit of body, or otherwise these diseases will not take place, although some local situations predispose so much to aguish diseases, that very few escape them in the autumn. But we may remark that the weakly, inactive, and delicate females, or children, are most apt to suffer, and robust and active men, are the most apt to escape these diseases.

There are many large districts, or even countries, where perfect intermittents are never generated—the northern parts of Britain and Ireland, are happily exempt from them. These countries do not derive their salubrity in this respect, from a dry atmosphere; for we are persuaded that no part of the world is subject to more frequent rains, cloudy weather, and moisture of the air: neither is the surface of the earth universally dry; for there are numerous tracts of marshy ground, meadows, and turf or peat bogs, which are commonly covered in a great measure with water, particularly in the time of rains; and also many parts where the soil is an adhesive, loamy clay, which does not absorb the water; but there is no putrefaction, or decomposition takes place in either of these substances. The turf forms a good fuel for the inhabitants, when the absence of rain will permit it to be sufficiently dried; it is evidently a congeries of vegetable matters, which has been accumulating for ages; for parts of trees, and often very large whole ones, principally of oak or fir, are found covered five or six feet deep under it, and hazlenut shells, bark and branches are also found; and although these trees must have lain there, for many centuries, they are still very good timber for domestic purposes. But so slowly does putrefaction proceed, that all vegetable matters are as well preserved in those places, as they could be by the most careful pickling, or candying; and this property is evidently the cause why their neighbourhoods are so healthy—for no putrefaction takes place.

We may be excused for thus introducing an account of countries where intermittents never appear, as a contrast to those where they are annually endemic. We may observe, that there are no diseases more influenced by local situation, than these are; for in most persons, the place of

residence may either cause, or prevent them. We commonly find a similarity in the local diseases of unhealthy districts, both in their natures, their appearances, and also in their proper treatments. This affords us one connecting medium.

The paroxysms or fits of agues generally come on without any previous notice. There is commonly on the approach of the fit, an inclination to yawning, stretching, and lassitude, commonly attended with a sense of uneasiness in the stomach, and frequently an inclination to vomit; here, as in most other affections of the stomach, the head sympathizes with it, and generally aches violently. The skin also by reason of its sympathizing with the stomach, becomes dry and shrivelled, having the appearance of goose skin. And all the membraneous parts of the body appear to partake of the affection, accompanied with an aching, which sometimes would appear to be in the bones of the limbs, or muscles. There is commonly a pain of the back of the neck, and loins, and a dislike to an erect posture, so that the patients can scarce avoid lying down, wherever they happen to be at the time. It is curious to observe in this, as well as in most other affections wherein the stomach is diseased, how readily the skin, and all the membraneous parts take the alarm, and are affected with it. The pulse becomes small and contracted, and is often scarce perceptible; a pain in the eye-balls, or rather in their bottoms, with anxiety, and coldness; so that the patients can scarce prevent their teeth from shattering.

This cold stage commonly continues an hour or two, before the warm stage commences. The trembling commonly begins in the lower limbs, and from them ascends to the arms; so that it has ceased in the lower, before it begins in the upper limbs. But the heat, as well as the cold, begins first in the stomach, and is propagated from thence to the other parts of the system. The kidneys also appear to partake of the affection; for during the cold stage, the urine which is secreted, is of a clear pale colour; but in the hot stage, it is high coloured. The skin becomes soft and moist, the pulse full and distinct, the head-ache abates; but an insatiable thirst runs through all



the stages, with an aversion to all solid foods. This is the general progress, of a regular paroxysm of a well formed intermittent; which as soon as the perspiration commences, leaves the patient in a very fatigued state; so that they generally incline to sleep, after which they are often apparently free of disease, until the next period. But there are great varieties in the severity, and continuance of these attacks; for instance, in some, there are little or no cold fit, and in others, there is very little of a hot stage; some are perplexed with head-aches at night, and profuse perspiration, even long after the paroxysms are overcome by medical aid; but all these varieties are influenced by the patient's habit of body, age, sex, temperament, &c. and also by the local situation where he is attacked. In order to convey an adequate idea of a paroxysm, it is requisite to be acquainted with the physical properties of the human body. As the vessels on the surface are constricted, in the time of the cold fit, the fluids must be propelled to the interior parts, and consequently the viscera, and large vessels are loaded with them; this will cause them to act with greater force: hence the anxiety, pain, &c. caused by the distention opposing the rigor.

It appears to be a general law, through every part of the animal economy, that when any part is distended, with its proper fluid, it will be the more strongly stimulated to contract, in proportion to the distention which it suffers. The heart is stimulated to contract by the blood, and the trunks of the absorbents by their contents, the bladder by the urine, and every viscus by its proper contents; and this, without our supposing any acrimony being generated in the fluids, although in continued fevers, and some other diseases, we may suppose there are some salts, or their component parts predominant in the fluids.

The cause of head-aches have been accounted for in this manner. The vessels of the interior parts of the system, being stimulated to stronger actions, in order to propel their contained fluids, the head and other interior parts, are loaded with blood. Hence the head-aches in the time of the paroxysm; and no doubt, the brain by its vessels being distended with blood, may furnish the nerves with

more animal spirits, and increase their influence by their glands being stimulated; for in the opposite extreme, when their vessels are emptied by blood letting, in an erect posture, or any other cause which lessens the propulsive power of the heart, a weakness and fainting ensues: but as the heart and brain, act upon, and stimulate one another reciprocally, they no doubt, do the same in fevers.

A stimulus being added to any of the glands, also increase their secreting power. In the cold fit of an ague, the internal parts are full of blood, particularly the viscera of the belly are distended, and thereby stimulated to a larger secretion of bile than ordinary. This is always evinced, either by vomiting of bile, or by sickness, and uneasiness at the stomach, by the bile regurgitating into it. For the sympathy between the skin, and the biliary secretion, and between them both, and the stomach is very evident here; for being exposed to cold causes a redundancy of bile, and sickness of the stomach, and pains of the bowels.

The stomach, intestines, and liver often affect one another by sympathy—the stimulus extending from one to the other. And the other glandular secretions, are increased in the same manner, and accounted for on the same principles, during the paroxysms of fevers. The force of the heart being increased by a greater quantity of blood, labours to overcome the resistance, if it has sufficient strength, and is not over much exhausted of its energy—but if deprived of this, it is overcome by the conflict, and death ensues, which sometimes happens to be the case, in the cold fit; but this is the mode in which death approaches, in other cases as well as this; for the external parts, near death, have much the same appearance, as in the cold fit of an ague, the blood recedes from the external parts to the internal—the heart, lungs, and the veins are loaded with it; and the external parts are shrivelled, the vivid ruddy, and lively colour departs, and the patient assumes the ghastly death like appearance, so easily known to those, who are used to see their fellow mortals in this; their last extremity. But when the strength of the

heart is sufficient to overcome the resistance in this conflict, the heat and feverishness ensues, until a balance is again brought about, between the several functions, &c. and then there is an interval of health, of uncertain duration.

This rationale of the cause, progress, and termination of the paroxysm, we hope, will appear satisfactory, and agreeable to the general laws of the animal economy, in the progress of diseases.

An ague when once formed becomes habitual, and unless the mode of life, or the habits, or place of residence are changed, it may last a long time; and the slighter it is, and the seldomer it returns, the longer, in general is the duration of the disease, when left to itself. And the more violent any periodical fever is, the shorter, generally is their duration, until they terminate either in death, or recovery. But this seems to be a general rule in the animal economy; for any of these diseases which would soonest destroy the constitution, when left to themselves, are the soonest cured, when properly treated. Hippocrates had some idea of this, when he said, that a quartan must last until it has made up the same number of hours with a continued fever, of fourteen days. We consider all periodical fevers, as intermittents, and remittents, as belonging to the same class, and very nearly allied; and dysenteries, as only fevers taking a peculiar direction towards the intestines. In dysenteries there are always exacerbations towards the evenings, and remissions in the mornings; and the same causes, with several variations produce them with all their varieties, in proportion as the exciting causes are slight, or more aggravated, and the preventatives and cures, are in some things common to all of them. In different people, fevers of the same species vary widely, without any external, or visible difference in the habits, or constitutions of the patients themselves.

The cure of agues has given as great latitude to empiricism, as any other disease, with which the human body is affected; and of consequence as great varieties of medicines have been used in it. Dr. Lind long ago, enumerated several hundreds, and the number is always in-

creasing; but with a proper knowledge of the animal economy, and the *Materia Medica*, together with an accurate idea of the disease—this, or indeed any other disease, may be overcome by a very few medicines, when properly applied. But although the cure of an ague is often easy, and simple, yet it requires medical skill very often, to overcome it; for it may frequently be cured, by the same medicines, which an ignorant person, may have used in vain; and even in large quantities; this we have often known to be the case.

As this disease is so easily known, and so general in unhealthy situations, there is no necessity for giving a long account of prognostics. It generally makes its appearance at first, by a sense of coldness at the stomach; yawning, and stretching, and slight accessions of paroxysms, which afterwards become more strongly marked, as the disease, by frequent slight accessions, becomes more confirmed—but what has been already said, in the history of this disease, may be sufficient for the purpose. Agues and periodical convulsions, are very similar, both in natures, and their modes of treatment, especially those agues which are unaccompanied with fevers.

In the cure of an ague, whether quotidian, tertian, or quartan, much the same plan may be followed, as to treatment. An hour before the accession of the fit, or paroxysm, an emetic may be given, in case the time of accession is well known; as it commonly returns nearly about the same time of the day—the most common time is about 10, or 12 o'clock; but it often anticipates, or delays an hour, more or less. When the emetic has begun to operate, before the rigor is perceived, it may answer the better; so that the languor, anxiety, &c. may be in some measure obviated, and a perspiration brought on. By this means the cold stage will be in a great measure prevented; and consequently, the hot stage much lessened, and the paroxysm altogether shortened, and alleviated: and in some slight cases, the return of future ones prevented, although this happens but seldom—working the vomit off in bed, and keeping warm covered, until the sweating stage is over, and using warm drinks, is very



proper—it may be very useful the next day, where there are any irritation present, to give castor oil; and after all is over, the bark may be begun—from three to six drachms may be sufficient, for one who has not been habituated to this medicine, taken between the paroxysms; but those who have been accustomed to the use of the bark, or to bitters, as preventatives, or to spiritous liquors, require much larger quantities; but this must be left to the discretion of the prescriber. But we must regret the too frequent, and unnecessary use of bitters, in spiritous, or vinous liquors, as they are, when used unnecessarily, no better than a spacious way of dram-drinking. The pernicious effects of this last, have been sufficiently delineated already, by many of the present, as well as former ages. However they are not equally pernicious in all habits of body, or local situations, or state of the atmosphere—for in the lax, and phlegmatic habits of body, and in a moist, warm atmosphere, there is some apology for these stimulants. But even here, and under such circumstances, if these medicines have not been made too free with, on former occasions, they may be better avoided, especially before dinner—it is a most pernicious custom to use them, unless, in cases of urgent necessity; but in a dry and pure air, and in healthy, firm, habits of body, drams, or bitters are inexcusable; but especially in the mornings, either in a warm, or cold climate, unless where urgent necessity, as sickness, or weakness demands.

The best method of giving the bark, is to begin with as large doses, as the stomach will bear; but not often repeated—this will do more in changing the constitution, effectually, than by giving small doses, and repeating them often. For by this last method, the body becomes habituated to it, before the disease is cured, which destroys its effects, in a medical sense. And because the principal intention in the cure of agues, is to make a change in the habit; and if we may use the expression, making it change, or forget its usual customs, and periodical movements.—For when the body is some time habituated to any periodical disease, or other movement, for a length of time, it will return after the cause is taken away, keeping to its

usual time. This is the case with the ague, as well as several other diseases; on this account it is that the cure, putting the constitution out of its usual course of proceeding, may overcome the disease—it is by this means, that emetics are useful, in the coming on of the fit; so likewise is active exercise—even the bark itself, operates by fortifying the body against the periodical returns of the disease. And in the time of the fit, we have constantly found the best effects from a draught of antimonial wine, laudanum, and spirits of hartshorn, a full dose of each, which we have frequently known to cure the disease by itself, without any other medicine, in recent cases, and a dry, warm, and pure air, and a good habits of body.

But the great object here, is to endeavour to find out the intention to be pursued; and as the principal indication in the cure of agues, is in the first place, to obviate the paroxysms, by putting the habit, out of its usual routine, and by this means to obviate their periodical returns, by stimulating medicines, food, and drink, and afterwards, bringing about a change in the constitution, by strengtheners, as bark, bitters, steel, aromatics, &c. and their preparations, taken in the intervals, in order, as soon as possible, to bring the body into a healthy state—the shorter time they have been allowed to go on, and the less the constitution has been habituated to them, the better, and the easier is the cure, (contrary to the doctrine of desputation, and maturation.) Agues are easier cured in a week, or fortnight, than in a longer time, &c. for their continuance weakens the patients constitution, and the frequent recurrence of the paroxysms, causes them to become habitual, and difficult to be overcome. But as there are every variety of intermittents, and remittents, and innumerable intermediate grades, from the simple quartan, which returns every third day, and leaves the patient entirely, on the intermediate days: or the tertian, which returns every second day, and leaves a well day between, to these where the remissions are scarcely perceptible—therefore the treatment must be infinitely varied, in proportion to the severity of the disease. Where there is an appearance of an inflammatory disposition;

sometimes bleeding may be proper; and where the disease puts on the remittent appearance, with only imperfect intermissions, it should be treated nearly in the same manner as remittents, with antimonials, and laxatives, saline draughts, or *spt. mindereri*; and when the inflammatory diathesis is gone, or where none appears, the bark may be given in the intervals.

In obdurate cases of agues, which have continued a long time, either through the neglect of timely application, or the inefficacy of the method which may have been used, the cure must be varied according to the circumstances of the case. If the bark has been used in sufficiently large quantities, it may be conveniently mixed with port wine and water, to any degree of strength; and when an ounce or two proves ineffectual, other additions must be joined with it; as bark one ounce and an half, snake root half an ounce, in wine and water, of each one pint. Preparations of iron, as the rust of iron, or salt of steel, tincture of iron in spirit of salt, or any other convenient preparation of it, and snake root, are likewise often useful additions to the bark, especially in torpid constitutions. We have sometimes used powdered ginger with the bark, advantageously. These additions are most apt to answer in cold phlegmatic habits; and bitters of camomile flowers, gentian, and columbo root, and others, are all useful auxiliaries. Mustard likewise is sometimes of use; and other stimulant and strengthening remedies. On the continent of Europe, where both the physicians, and their patients, are yet prejudiced against the bark of Peru, bitters and stimulants are more used than elsewhere, and also astringents and strengtheners, and garlic, is much used; and it is said they often cure agues with these, without having recourse to the bark. In my last return from India, when short of bark, we succeeded in curing agues, with powder of Virginia snake root, and prepared iron, with infusion of camomile flowers, and a moderate use of wine, and spiritous liquors are serviceable; but not to such an extent as to promote giddiness; for then they do more harm than good, by weakening, and ex-

hausting the vital energy of the habit, and leaving it lower than before.

In very old and obstinate agues, towards the winter, we have sometimes found good effects from pills of blue, or white vitriol, one grain of either, and three or four grains of extract of bark; one or two of these taken daily, has sometimes with us cured simple periodical agues, where no fever was present; and we have no doubt but the nitrated silver, may also be as efficacious in this affection, as in the epilepsy, or other convulsive diseases.

Arsenic, although a violent poison, has been used very safely also in the cure of agues. Dr. Fowler who first recommended it to the public, advises thirty four grains to be boiled with an half pint of water in a Florence flask, adding one drachm of vegetable alkali; ten or twelve drops of this is a dose for a grown person, two or three times a day; instead of a sand heat, it may be boiled by setting it among the ashes and coals of a common fire. We believe the nitrous acid, (aqua fortis) a solvent preferable to the alkali; half an ounce of this, and half a drachm of finely powdered arsenic, may be boiled together in a Florence flask; and the dose may be increased daily.

It is a very common occurrence, in old and obstinate agues, for obstructions to form in the viscera of the abdomen, as the liver, spleen, pancreas, mesentery, and other glandular parts, and to cause swellings of the belly, and of the legs. We believe there is nothing preferable in these cases, to purgatives, bitters, and especially mercurials, in small and repeated doses; as a grain or two made into pills, with six or eight grains of the pills of aloes and myrrh, or the compound pills of colcynth, repeated every two or three days, with bitters and stomachics on the intermediate days, and gentle exercise, is also a very necessary part of the cure, to promote the circulation, and absorption of the fluids; and by the acceleration of their motions, to promote the generation of a greater degree of animal heat, and consequently to prevent the cold fit. The best time to use exercise, is just before the rigor is expected to return; as by that means the body may be thrown into a warm and perspiration, the more effectually,



to prevent the accessions of the paroxysms, without exhausting the strength ; and we have this consolation to know, that if we can by any means of this nature, put over the time of its accession, it is one step towards a cure ; but even when it is put off for a period, or two, it is apt to return at intervals of a week or fortnight, especially at the change or full of the moon : therefore, the bark must be had recourse to every week, at least, for some time after.

As in agues, or remittent fevers, there appears to be a deficiency of animal heat, or at least an unequal, and imperfect distribution of it, coming on in excess after the cold fit is over, at first only partially, some parts being warm before others, it should be a principal part of the cure, to prevent, as far as in our power, the accession of the cold fit, by exercise, cordials, volatile aromatic spirit, and laudanum, to put the habit as much as possible out of the use of attending to its periods ; for by this means we make a considerable advance towards the cure : for the vital energy being accumulated in the time of the cold fit, it breaks out with redoubled vigour when that is overcome. Exercise, as it hastens the circulation, and the respiration, is of considerable advantage ; for then more pure air must become fixed in the lungs, and consequently more of its heat is imparted to the body. Exercise also promotes the circulation in the blood-vessels, and absorbents ; and is on all these accounts, of very important use, in preserving the health of the body ; but then it must not be carried to excess, as that would be as bad on the other hand. But as a torpor of the extreme vessels, appears to be a very general attendant of agues, and a listlessness, and an incapacity to motion, and a depression of spirits, every means should be used to exhilarate the drooping spirits of the patients by agreeable company, change of place, and air, riding on horseback, and amusements, but especially in a pure air ; and every means should be used, which conduces to strengthen the habit of body, by the most nourishing food, drink, and cordial medicines ; all of which are sometimes necessary, in obstinate cases of this disease.

In the spring, the setting in of warm weather conduces much to the cure of agues ; hence the vernal agues are more easily cured than the autumnal : they are likewise fewer in number—scarce any being taken at this season, but those who are very much predisposed to them from habit of body. A principal intention to be kept in view, in the treatment of intermittents, as well as other habitual periodical diseases, is, as far as possible, to obviate the habit, or to prevent both the disease, and the medicines from becoming habitual. On this account, beginning with large doses of medicines, and not too frequently repeated, answers by far the best ; for, if on the contrary, we were to begin with small doses, frequently repeated, we may habituate the body to the use of them, before the cure is effected ; so that they would produce very little, or no effect. And in this way the powerful effects of opium, bark, or wine, may be nearly lost ; for many people by beginning to use the bark by scruples, or half drachm doses, every hour or two, and finding this quantity produce no effect, they increase it gradually, and go on with it, and in this manner, some persons have taken whole pounds of bark for a cure, when a few ounces judiciously managed, would have done it more effectually.

Animals when in health and vigor, we may say with propriety, have a due quantity of vital energy ; and when they are predisposed to an inflammatory diathesis, the vital energy is too redundant to be consistent with health ; for then a very small irritation may bring on disease. But the disease under consideration, is commonly more owing to a deficiency of vital energy, when other causes act in concert with it, as by getting cold, or being weakened with other diseases, a cold, lax, or phlegmatic habit of body, and consequently a deficiency of animal heat ; especially where the person breathes an air, impregnated with marsh miasmata.—A person in this situation, being exposed daily even to a small degree of cold, will first perceive a periodical chill ; which, from habit will increase every time it recurs, unless some other cause should oppose or counteract it ; and in this manner periodical fevers appear to be formed, when nature follows her own uninterrupted

course. But in the time of the hot fit, there are violent commotions excited in the constitution, this exertion exhausts the vital energy, and then subsides, leaving the patient languid and weak, by expending the energy in a profuse manner. Hence the longer it goes on, or the oftener it returns, the more it weakens, and dissipates the vital energy, and disposes the glandular viscera to obstructions, as the liver, spleen, mesentery, &c. and often lays the foundation for dropsies and other chronic diseases; for these viscera are predisposed to obstructions on account of their peculiar structure, more than any other part of the body, as is shewn in another place; so that although this disease, is seldom very alarming in its appearance, it often leaves the most serious consequences, after it has been suffered to continue some time, if not judiciously treated; and on that account it merits particular attention.

Preventing the cold fit, as far as in our power, by means of stimulants, as opium, wine, volatile salts, &c. administered half an hour before the time of its accession, and likewise by exercise, so as to heat the body, is of great service; because whatever can prevent the cold fit, in a great measure, also prevents the warm fit at the same time; as this latter is little more than a consequence of the former. All the secretions and excretions, are profusely increased in the hot fit, particularly the perspiration, and the energy is soon expended; the whole body is left in a state of languor, so that now the different organs, cannot obey their native stimulus, and therefore, obstructions form in the most inert viscera, as the liver, spleen, &c. Hence the use of stimulant purgatives, when we suspect this to be the case, as calomel, and pills of aloes and myrrh, to be repeated once or twice a week in obstinate cases, as prudence may direct.

We only expect a temporary effect from stimulants; for they do not add any permanent energy to the system. For this purpose, we are to depend upon the bark, and steel, or any chalybeate preparation; and in case we wish to use a stimuli along with these in phlegmatic constitutions, Virginian snake root may be added; the bark, and chalybeates also add to the permanent strength, and gives

energy to the system: whilst the snake root is rather a heating, or stimulant medicine; but opium, spiritous, or vinous liquors, or volatile salts or spirits, and exercise, are only temporary stimulants, without adding any permanent energy to the system; and we would wish this to be attended to, in the administration of the medicines recommended, and in the whole intention of cure.

Although there are innumerable remedies, and methods of cure, recommended in this disease, yet a judicious physician will find no great difficulty, in reducing them to a very small number of heads, or different intentions, which may be brought about by various, and often seemingly opposite, and contradictory methods. It must be allowed, that a great number of substances are held by the ignorant, as efficacious medicines in this, as well as some other diseases, which are so totally void of all efficacy, that if ever they did appear to perform cures, it must be more owing to their good fortune, in happening to be administered at a time, when nature would have performed the cure as well without their assistance, as with it. And many grave doctors, it has been said, have owed their celebrity to reasons no better founded.

As some opportunities have lately occurred to us, since the former parts of this piece was wrote, of making some additional observations, both on intermittent, and remittent fevers, in situations where they are as frequently endemic, as in any other part of the world—we may attach them to the foregoing; we have also found, that where they are the most frequent, they are also the most obstinate whilst their seasons continue, which is at its greatest height in September; but they generally become prevalent, in August, and continue until the frost appears in December. Some cases occur at other times of the year, particularly in the spring; but they are commonly easily overcome by exhibiting emetics, half an hour before the accessions of the paroxysms, so as to be operating at the time of the accession, by which means they frequently overcome the febrile action, or at least render it milder. A stimulant cathartic, composed of rhubarb, and jalap, ten or fifteen grains of each, and from one to three grains



of calomel, was a very necessary part of the cure; particularly in lax, or phlegmatic constitutions, where no symptoms of irritation appeared, particularly in moist, or rainy weather; but in the warm and dry weather, particularly in robust, or irritable patients, common salts, or castor oil, were extremely useful; as the patients commonly had very uneasy sensations in their stomachs, similar to that in remittents—here the castor oil, was a very necessary part of the treatment; and at the same time gentle antimonials at night. And in case of great uneasiness, and want of rest, where no inflammatory disposition appeared, a few drops of laudanum. The premature, and excessive use of the bark, before these very necessary evacuations, we had too many opportunities of witnessing, in the practice of some others in our neighbourhood.

In the spring, or summer, after these preparations, a few doses of bark commonly carried off the disease, such as a drachm or two early in the morning, and at noon; for we have always found the bark answers best when given on an empty stomach: neither eating, or drinking, for an hour, or two afterwards; for we are much in the persuasion, that it produces its effects on the stomach, only—and consequently it must act the more powerfully on its coats, when it is most empty, as bitters also; and we believe most other medicines do. Another consideration, which, in public practice answers well, but which we have seldom known to be much followed by private practitioners, was to give the bark in as large doses, as the stomach would bear, and not to harass patients every hour, with scruple, or half drachm doses—half an ounce, or often more, two or three times a day, answers much better, in every respect. But it must be confessed, that there are some persons of such delicate sensations, as not to bear large doses of this medicine; but if they can take the powder in any form, it will be much easier taken seldom, and in large doses, than in small ones, frequently repeated; for the principal cause of aversion to it, is the roughness it leaves in the mouth; and a scruple produces this sensation, as well as half an ounce. The action of the absorbent vessels, appears to be very defective in this dis-

ease ; it is apparently on this account, that emetics and stimulant cathartics, are so eminently useful ; but we know that there are some exceptions to this, as a general rule : in strong, young, and inflammatory constitutions ; for lenient sedatives appear to answer better here, at the beginning of the disease, especially in warm, dry weather ; in which times, and temperaments, the disease is apt to assume very much the appearance of a remittent, especially during the first two or three days of the attack. It is often impossible to foretell, whether it will be in future accompanied with perfect intermission, or only remissions of the fever. Of this, we can only judge by the concomitant circumstances, the patients habit of body, the present symptoms, and the prevalent diseases in the neighbourhood ; but in such situations as we here allude to, there are every grade and variety, from the slightest intermittents, to the most violent remittents, there does not appear to be any specific, nor well defined limits. And also the dysentery, is more nearly related to these affections, than is commonly imagined ; although that is a common disease, in some healthy northern countries, where these others never appear ; and also in some other high, hilly, and otherwise healthy countries.

From what has been said here, it will appear, that it would be an endless undertaking to specify all the varieties of intermittents, which may appear, in unhealthy countries—all that can be done in this way, is only to fix the land marks, or to lay down some of the principal outlines, and to direct the young, or inexperienced practitioners, to depend on a well founded knowledge, of the physical nature of the human body, of its diseases, and remedies ; for the remainder. For it will appear obvious, that where the disease verges near to the remittent form, the treatment must be accommodated to the occasion, and must be similar to that of the most slight remittents, as their differences are sometimes imperceptible.—Here the fever must be overcome by gentle laxatives, as castor oil, or salts, which ever of them are most agreeable to the patient, and antimonials with the saline mixture, (or vinegar saturated, with the volatile alkali,) either the

salts, or spirit of hartshorn, so as to neutralize it; of which a table spoonful may be taken, with from four to six grains of the antimonial powder. Bleeding may also in these cases, be very necessary at the beginning; particularly where hardness of pulse, and pain across the orbits of the eyes are present; for neither season of the year, nor situation should prevent this, where these symptoms are present to indicate it.

In this practice, we have sometimes been under the necessity of being singular—for preventing the returns of aguish paroxysms, we have used laudanum; and spirit of hartshorn, given just before the accession, in full doses—the additions of any antimonial, we have seldom used lately, for it did not appear to be any improvement, to the composition, especially where there were an over great propensity to vomit, and a wish to prevent it; as should be always done, when there is much irritability in the stomach, &c.

The varieties of intermittent fevers differ as much from one another, as some of them do from remittents. For the short chill, followed by little or no warm accession, which is common as the winter approaches; or in moist, and cold weather, in other seasons of the year: are very different from the severe rigors, and violent fevers, of several hours duration, accompanied with delirium, especially in the night; with profuse perspiration, and tormenting head-ach, which often prevents rest altogether, for many successive nights—and which even wine, opium and camphor, although the most powerful medicine for it, can scarce subdue. And yet in this state there are very perfect intermissions, in which no symptom remains, but weakness alone. The length of these paroxysms and remissions vary, from six to twelve, or eighteen hours alternately—in some the remission will only continue six hours, until another chill succeeds; and in others it will continue eighteen hours; but in some of the worst cases there is neither intermission or rigor. In these the disease is very similar to remittents, and requires a similar treatment. But here, as well as in all obscure diseases, it is by the symptoms which will never deceive us, and not the

names that we are to be directed in our treatment: for besides that, the names of diseases are often misapplied. It must appear, from what we have related of the various states, and appearances of this disease, that those who depend much on them, will often be deceived; even without the additional confusion of a half dozen of nosologies.

There are other varieties of this disease, wherein there are only slight feverish accessions, without any chill, or rigor. This is the *febricula* of late authors; but by the populace, it is named the dumb ague—this term is not well understood, unless in agueish situations; it prevails chiefly among weakly, and delicate women, and children; and sometimes among men, whose habits of body are weakly, and live on a too low regimen, in unhealthy situations, or close towns, and lead sedentary lives; but this is a very different variety of the disease, from that which attack with a chill only. They also require very different modes of treatment, although both are commonly called agues; for the one is only a cold, and the other a hot fit, or paroxysm, properly so called.—Where there are only a chill, or rigor, emetics taken before the accession of the paroxysms, are often effectual of themselves, or stimulant doses of laudanum, and spirit of hartshorn, with a few moderate doses of bark, and snake-root, or even the snake-root by itself, often effects the cure—but in the little fever, or the *febricula*, emetics are not always advantageous, or even admissible, on account of the irritability of the stomach, and the weak nervous state of the whole system; but the first passages may be cleared by castor oil; and then bark with good Port wine, and cordials, and nourishing food, with fresh air, and exercise, are the proper means by which a cure is to be obtained. We have pointed out these four principal varieties of intermittents; but there are between them every imaginable shade of difference, or as we may express it, evanescent, and converging appearance; some approaching more to one form than to any of the others, and their treatment must be regulated accordingly.



We have hitherto scarcely taken notice of the periods, at which the paroxysms return ; we have seen them most-ly, either daily, or once in two days ; seldom once in three days ; in the early part of the autumn, they are most apt to be daily, that is when the air is most strongly impregnated with the miasmata. But towards the cold weather, they are commonly once in two days—and some rare instances happen of quartans, in the cold weather—but it is very common for daily intermittents to change into tertians ; or at least, after they are overcome for some time, by medicine, to recur in a fortnight, in the tertian form, for they are very apt to observe these distances of times in their periods ; and getting a cold commonly renews the disease.

As the most acute diseases are commonly the soonest cured ; especially acute fevers. So also the more frequently the fever returns, and the longer the paroxysms are, the shorter it is apt to be in its duration, if properly treated ; and also the sooner it would terminate, if left to itself. Quartans are commonly the most tedious of cure ; and perfect, and distinct tertians, are more tedious than quotidians. When the cold fits are followed by little or no feverishness, they appear to partake as much of the nature of periodical convulsions, as of fevers—here the principal intention of cure, appears to depend on obviating the paroxysms, by emetics given before the accessions ; or laudanum, and spirit of hartshorn. And on the intermediate days, especially the day before the attack, bark, with snake-root, and chalybeats, are apt to answer well—but the degree of feverishness, or inflammation, must be our directory in the modes of treatment. When the fever returns daily, there is little time to give the bark, in the intervals between the fits ; but when every second day, the best time to give it is in the morning before the attack, if it does not come on before noon ; but the evening before if it does. For this medicine appears to oppose the disease more effectually when given a short time before the accessions ; but it often fails unless assisted by other medicines ; and we are rather led to suppose that it acts as a preventative, than as a cure.

*On Remittent Fevers.*

**R**EMITTENT Fevers prevail chiefly in the autumn, in warm countries, or after warm summers, in more temperate climates. They are to be distinguished from intermittents, by the patients not being free from fever between the exacerbations, as they commonly are in intermittents; and by their paroxysms returning more regularly, as in some cases, twice in twenty-four hours; although the most common period, is once in two days; from which circumstance, they have been denominated tertians; and the former, irregular, erratic, and subintrant, from the irregular and uncertain times of their attacks. Remittents are to be distinguished from continued fevers, these last being without paroxysms, or intervals of ease, although there may be slight diurnal remissions, towards the mornings, and accessions in the evenings; yet this is mostly caused by the diurnal revolutions which attends us in our best health, from exercise, study, or business, the heat of the day, or stimulant food or drink; and this attends us as a habit; also in a state of sickness, although few, or none of these causes may then operate on us; but we are not for this reason to denominate continued fevers remittents.

The common appellation of bilious fever, applied to this disease, when by the irritation of the stomach, the liver is so affected, as to cause an increased secretion of bile, or a jaundiced appearance of the skin all over, and particularly of the whites of the eyes; but the name of bilious fever is very indiscriminate. The appearance of bile in either of these ways, is only accidental, and not a constituent part of the fevers, much less is it a certain symptom, to distinguish one species of fevers, from others; for it only shews that there is some irritation in the first passages, which causes these appearances. There are some remittents which happen in the spring, but not so

common as in autumn, or after the greatest heats are over, which may justly be called the sickly season in most countries.

As there is every possible intermediate shade, between the most perfect intermittents, and the most violent remittents, and from these last to the most continued fevers, we can perceive, that to distinguish all the varieties which fevers assume, would be an endless labour; it is therefore best to give the principal distinctions, and let every practitioner find out the varieties, as the symptoms indicate, or as they approach to one, or other, of the principal varieties here mentioned, or by any better mode, if he is acquainted with any such.

Another division of fevers might be into such as are caused by marsh miasmata, and vegetable putrefaction, from those caused by animal putrefaction, and infection, which may form a second genus. The first of these classes are generally of the intermittent, and remittent types; and those of the second division, are of the continued form: this in my mind is a natural division of fevers, and the distinctions, and discriminating circumstances between them, is most easily understood, and obvious to our senses; and these distinctions are likewise of great importance in practice. To these divisions may be added a third, which are of an intermediate nature between them, and partaking of the nature of both, and derived from a combination of the general causes of the other two; requiring both marsh miasmata, and infection, such as the autumnal remittent, when it becomes infectious. This last genus has gone under different names—as the yellow, malignant, and pestilential fever.

But besides these general classes of fevers, there are innumerable varieties, caused by the different temperaments, habits, and constitutions of people, and by age, sex, climate, and modes of life; for fevers will be attended with an inflammatory disposition, in some people, and none in others; although the disease was originally the same. This circumstance is well exemplified in the small-pox, and some other such familiar diseases: these are differences which require the sagacity of the most experi-

enced practitioners to discriminate, and to treat each with propriety; and here if there were any necessity for it, as the matter of fact is too obvious of itself; it would be very easy to demonstrate the impropriety, and mischievous consequences of recommending any one general method, of treating any epidemic, by the same round of medicines; without first trusting to our senses, in the examination of the symptoms, and regulating the plan of procedure accordingly, together with other particulars, equally necessary to be known, as the habit of body, &c. Whenever a medical man obliges every person in a fever, to go through the same circular routine of medicines, we cannot avoid forming a very indifferent opinion of his medical abilities, however dignified he may be; for to practice in this manner, we might as well have writing figures, or machines, to act the parts of physicians, as rational beings; for erudition, experience and reason, must in such practice as this, be set aside as useless.

An increased irritability of habit, with a diminution of vital energy, and of the inherent strength, is to be carefully distinguished from an inflammatory disposition, or increased vital energy, with strong, full and hard pulse; but these are in some cases so intermixed, as to require particular attention in the practitioner. In the low and irritable state, the pulse is apt to be very quick, but small, from 120 to 135 or 140 in bad cases; but in the true inflammatory state it seldom exceeds from 100 to 120, allowance being made for the age, sex, and temperament. And as these two states require very different modes of treatment, there is the greater necessity for being particularly attentive to them. When these states are mixed, the predominant one is to be paid most attention to in the cure, as we shall endeavour to explain hereafter; for to be capable of distinguishing and treating these dispositions properly, are objects of the greatest consequence, both in the practice of physic and surgery.

Notwithstanding the difference in the diseases produced by miasmata, from those caused by effluvia and infection, it is not uncommon for these different causes, to operate conjointly, by being applied in different proportions, and to



produce fevers of mixed types. In some northern countries we seldom see remittents; but in warm latitudes, intermittents are rare, but remittents are common. It appears therefore, that intermittents are caused by the smallest quantity of miasmata which is capable of producing a fever, and remittents are caused by the greatest quantities of it, impregnating the atmosphere strongly. The same air however, with some variation, will produce dysenteries, particularly when it is moist, and a sudden cold comes on, obstructing the perspiration suddenly, and affecting the stomach and intestines by sympathy, and suppressing the perspiration. Dysenteries are upon this account to be met with in some temperate and healthy northern countries, where neither remittents, or intermittents are ever to be seen. But although they are often caused by marshy exhalations, they are sometimes caused beyond their influence. On the continent of America, the farther to the southward, remittents are the more common, and intermittents more rare; but as we approach to the northward, intermittents are more common, and the others less so, in situations respectively healthy, or unhealthy. But there are all the varieties and intermixtures of these imaginable, in their intermediate degrees; so that to distinguish and designate each variety by an appellation would be an endless labour, and only add perplexity to a reader who would consult these descriptions. It may answer better therefore, to keep the principal distinctions in view, and not confound the subject by useless refinements, and distinctions without end; but to point out the mode to follow nature in her varieties. Upon these accounts fevers will not, like minerals, vegetables, or animals, admit of a distinct mode of classification; and even so far as we do divide, and distinguish them, it is only intended for a faint outline of nature, but not a true representation of all the varieties of diseases; which they are no more like, than a chart of a bay, or coast, is like the land, or water which it represents. But although speculators, and system builders, by getting acquainted with one or two of the many principles and laws, by which the animal economy is governed, erect systems

upon them, which are commonly overthrown by the next enquirers, as easily as they were built. The nosological divisions, and subdivisions, may be carried to infinity; and each different symptom, which appears in diseases, may be honoured with the title of an order, variety, or class, as has been frequently done, at one time or other; but it would be a very easy matter to shew, that such minutia, especially where they are uncertain, do more harm than good. For although we may find every particular disease, very neatly laid down on paper, yet by the greatest assistance they can give, when we come to the bed-side of the sick, there is always much difference to be found, from any previous description we have; for diseases are generally very different in nature, from what they are to be found upon paper; for although some of the symptoms, and appearances, may be always found to be as described, yet an attentive observer, will find obvious difference in every disease, both general and particular; for in general no two epidemic, or endemic diseases, will be found alike in every thing; and even in the same prevailing disease, when caused by the same general causes, scarce two persons will be found exactly similar. So that a practitioner may be his whole life time, attending the sick, and not see two patients exactly similar in every particular.

Diseases are so differently modified, and varied, by different local, and relative situations, habits of life, modes of living, constitution, age, sex, and temperament, that the more delicate varieties are infinite, as much so, as the appearances of persons faces differ from one another. For although there are a general likeness in the outlines of human faces, yet a person acquainted with them, can know one from another among thousands, or even millions of their acquaintance. This is one instance wherein our sense of sight, cannot be so compleatly expressed in words, as to convey all the ideas, exactly resembling the perceptions themselves. The same observation is applicable to our other senses, as well as this. Therefore, it is little more than the general doctrines of diseases, and their cures, which are communicable in any language—

therefore, both learner, and teacher, must condescend to consult nature, by real practice, and personal observation; together with every other means of information; for either, without the other, is commonly useless. For practice without extensive information, only constitutes an empirick; and large information, without its being modified with practice, generally makes men speculative theorists; and very unsafe practitioners, until they learn to bend their opinions to nature herself.

Some modern theories and systems built thereon, are very similar to the scholastic philosophy, in the dark ages of Europe, when Monks, and other scholastics, by heating their brains with the reveries of Aristotle, and Plato, in their retirement, and those of some of their immediate predecessors, erected systems innumerable thereon, merely out of the produce of their imaginations, without adding one new fact, by well attested experiment, or observation, to the common stock of human knowledge. But what was more ridiculous they formed parties, and quarrelled about these cobweb productions, with as much rancour, as the parties for the different colours, in the Roman amphitheatres of old. A meer theorist who bends his practice to any hypothesis, must always be a very dangerous practitioner. But those who, by diligent observation, and attention to experience, found their reasoning upon actual facts, coming under their own observation, or those of others, on whose reports they can depend, proceed as rational practitioners.

Fevers have been divided into intermittent, remittent, continued, and for a general classification, this mode may answer, and is very near the same we have pointed out. Dr. Cullen thought there was scarce any fever so constant, as to be purely continued; because almost all fevers have evening exacerbations, rising higher at one time of the day, than at another. Yet we think the low nervous, or typhus may be called a continued fever—and we believe all those which originate from human infection. The species of remittents, forms the middle link of the chain between the other two, both in the appearance of the disease, and the treatment.

These distinctions, however, may not be easily ascertained; for fevers are often so blended with one another, that it is often very difficult to determine; unless by a knowledge of the reigning epidemic, to which of the genera a single fever may belong; for sometimes intermittents will turn to remittents, or continued fevers—and the continued will turn to remittents. So that the appearance of fevers are as various as that of faces, which though they have some of the general outlines in common; yet by an exact knowledge of them, there are always a difference to be found, by good judges in these matters; even in fevers of the same common origin, owing to age, sex, constitution, habit, and an infinity of circumstances; so that it is very rare to find two patients in exactly the same situation, in all respects. Therefore the symptoms present, antecedent, and all other sources of information must be had recourse to; so far as a knowledge of the animal economy, and the operation of diseases upon it, will lead us. But it is fortunate, that in these intricate cases of fevers, the symptoms taken into consideration, with other circumstances of the cases, will generally set us right; and one acquainted with the different parts of medical science, and a good natural capacity, and rational understanding, will seldom be at a loss here, with respect to the most proper means to be pursued, for the relief of the patient, by moderating the symptoms, if they run high; lowering an inflammatory diathesis, or raising those who are depressed; by removing whatever increases the irritability of the habit. And although we may not, when once a fever is formed, be able to overcome it at once; yet its violence, and duration, may be much alleviated and shortened.

Remittent fevers in warm, and unhealthy climates, are apt to verge toward the continued form, especially in those of robust and full habits of body; and the more so if they have lately removed from healthy situations—but in temperate latitudes, they are apt to approach towards the intermittent type, unless they happen to be combined with infection, or are heightened in their malignity, with noxious effluvia. For in this case they may be so



heightened, as to put on the most malignant appearance, with scarce any, or very imperfect remissions; several instances of which are on record, where violent epidemics, originally of the remittent type, only heightened by infection, appearing, and disappearing at the same seasons, as other remittents commonly do; or otherwise we should expect them to continue the whole year round, as some other infectious fevers do. For among fevers, we see all the intermediate degrees, and varieties from common agues, or catarrhs, to the most violent infectious fevers, or even the plague; which may be considered as the worst species of fevers; and we believe, what is called the yellow fever, in its worst form, is not far removed from the plague, or pestilence; though some symptoms of the latter do not take place in it.

As the causes of remittents are so numerous, it would be endless to enumerate them all; but besides those which they have in common with agues, and continued fevers, we may notice some of the principal ones: among which may be reckoned, a continuance of warm, dry, weather, impregnating the air with vitiated exhalations, excesses of drinking, fatigue, or the heat of the sun, grief, despondence, getting cold after being over heated; all these appear to abstract the energy from the body, and leave it over irritable, and weak, and susceptible of being acted on by impressions from without, or set in motion whatever causes may be contained in the constitution, whether caused by a decomposition, or disproportion of the component parts, or by whatever other cause. It is probable that some of the very fine vessels may be irritated by their contents, and commotions raised to expel the causes, as seems to be the case, when customary evacuations are obstructed, as perspiration. We commonly see remittents appear after the greatest heats are over; and the colder weather obstructing the perspiration; while the body is at the same time left very irritable by the heat; and in warm climates, people unaccustomed to them are not sufficiently careful to guard against the effects of cold air—when very warm, and getting suddenly cold, obstructs

perspiration, over suddenly, frequently causes diseases, but of this they have no apprehension.

Remittents as well as agues, are apt first to affect the stomach, whether by its sympathy with the surface, or by the disease first attacking itself, it is difficult to determine; and the head-ache is in these affections, caused by sympathizing with the stomach, &c. which is so constant, and soon communicated; that it is most likely the stomach is first diseased, and from thence it is communicated to the head, and other parts by sympathy; so that a head-ache is an almost constant attendant in remittents, more or less, in proportion to the violence of the disease—For in bad cases there is a great sense of heat, and uneasiness at the stomach, with an inclination to vomit, and a general dislike to all solid food; but a frequent desire for drink, and an almost unquenchable thirst, which increases at the accession of the feverishness, and abates with the head-ache, as it wears off. All this appears to shew that the stomach is the primary seat of the disease. The paroxysms here, are not easily distinguished, unless by a pain of the loins, and in all the joints and limbs. The first two, or three days of the disease; it sometimes has the appearance of a continued fever, with very imperfect remissions; sometimes accompanied with an inflammatory disposition.

The tongue is at first whiteish and dry, afterwards a brownish yellow crust forms upon it, in the progress of the disease, with a bitter taste in the mouth, loathing of food, &c.

As an enumeration of all the symptoms, would be only perplexing to any reader, we only enumerate a few of the characteristic particulars; for although the diseases of the human body vary much in different climates, and countries, yet the greatest difference is, that in warm climates, diseases of an inflammatory disposition, are more rapid in their progress, than they are in temperate countries, especially in those who have lately emigrated from healthy countries, or local situations. And after the inflammatory diathesis is worn off from people of a northern climate, residing in the torrid zone, there is a species of spasmo-

diac irritability of which they are very susceptible, which remains with them ever after while they remain there—which those born in these countries are scarce ever troubled with; so that an increased irritability, first of the inflammatory species, and after the inflammatory diathesis (disposition) is worn off; that of the spasmodiac species takes its place. These are very generally the effects of hot weather, and hot climates, upon the natives of more temperate countries—and on the contrary, those who have lately removed from warm, to more temperate, or cold climates, are not apt to be affected with an inflammatory diathesis, but with the low nervous, or spasmodiac species of irritability, in whatever diseases they may happen to be affected with. But even in diseases of the same origin, and in constitutions, very nearly similar, with respect to age, sex, and temperament, one will frequently be accompanied with an inflammatory diathesis; whilst another will be more of the low irritable species—and in others a mixture of the inflammatory, and spasmodiac symptoms may be combined in the same person at first, but the inflammatory disposition wears off, in the course of the disease, as it always does, and after some days continuance, the low spasmodiac disposition succeeds to it, and keeps up the febrile irritation. But where a fever is very rapid in its progress, as in plethoric, strong constitutions, in warm climates, or where the disease has been propagated by infection, or by putrescent effluvia; these stages are not well marked, or totally imperceptible, or absent. For the violent inflammatory symptoms, if they have appeared, are soon followed by a putrescent disposition; but putrefaction is scarce ever a primary symptom; and it is therefore, a very improper appellation for diseases—but it has been applied to so many varieties of fevers, and so differently, by different authors, that it is very often difficult to find out what they meant by it; some use it to signify fevers, in which putrefaction takes place soon after death; but that depends so much upon the state of the weather, and habit of the person deceased, and the length, or violence of the disease, and other circumstances, that it is but a very indeterminate appellation of

any disease : for a body will soon putrefy after death, if the weather is hot. But some may be more predisposed to it, than others, as we may often observe in scorbutic persons. For if any disease deserves the name of putrescent, the scurvy does ; for it shews an incipient decomposition, of the constituent parts of the human body. And we believe a scorbutic disposition increases the danger of fevers, whenever one so predisposed, is attacked with it ; for although it may be denied, that ever putrefaction can take place in living bodies, yet they may verge towards it, even in a state of health ; and much more so in disease, and this disposition perhaps, might be what was meant by putrid fevers.

Bile was thought to be a cause of remittent fevers, because it is apt from the irritation of the stomach, &c. to be secreted in larger quantities, and to get into the stomach, by the intestinal canal being obstructed, and hindering its passage by its natural course, or when it makes its way downward, and causes diarrheas—or when the ducts are obstructed by stricture, or irritation, causing it to be regurgitated into the blood, and appear on the skin, and in the urine, and whites of the eyes—this as it shews a great degree of irritation inwardly, so it is a very dangerous appearance, if it shews itself early in the disease ; but by which ever of these ways the bile takes its course, it cannot be said to be a cause of the disease, but only a consequence of increased irritability. For whether it appears in either of these ways, or not, the disease takes its course, independent of it, so that its appearance can only be said to be accidental, and not a primary cause, or certain symptom of the disease. But the reason of the disease being solely attributed to it, is, because of its frequent appearance in these cases, and being so visible to superficial observers ; so that although only a consequence, it is often taken for a cause of the disease ; but we do not deny that it may increase the fever, and render it more dangerous, as it does in jaundice ; for a person can never enjoy a perfect state of health, when bile is diffused through the system, as in that affection, whether stagnation, and consequent putrefaction of the bile ever takes place in the



living body, is very doubtful, unless in cases of inflammation, or scirrhus of the liver; but of this we have treated already.

On the first attack of the fever, its type may be judged of, by a knowledge of the prevailing epidemic, and the violence and duration of the paroxysm; for in bad cases it will continue for two or three days, with scarce any evident remission. And on other occasions, very malignant fevers will be concealed, under apparently slight symptoms, never rising high, but exhausting the patient in a very insidious manner. This often happens where there is infection in the case, and appears to be nearly related to the low nervous, or typhous fevers. And when it is complicated with the predisponent causes of the autumnal remittents, it is one of the most destructive diseases, and requires, of all others, the greatest attention in the practitioner; and is the fittest to try his judgment, of any disease the human body is subject to, as we have often seen.

The treatment of this division of fevers must be directed by the symptoms present, the habit of body, and other considerations. It will, in many cases be proper to exhibit an emetic at the very first attack; but this may sometimes be forbidden, by great irritability of the stomach, or the appearances of inflammation—and an increased irritability, whether inflammatory, or spasmodiac, as either would be heightened by vomiting. But if none of these symptoms appear, and there is no danger in ruffling the constitution by an emetic, as in the phlegmatic, and those possessing but little nervous mobility; but especially in temperate climates, emetics may be proper; but in warm weather, either in robust plethoric habits, or in the irritable, they are extremely dangerous in their operations, either by causing an accumulation of fluids in the brain, or exciting troublesome commotions in the system, very difficult to be allayed, and of dangerous consequences, by ruffling the constitution, and causing a vomiting which cannot afterwards be allayed. But in the low, nervous, or infectious fevers, of temperate weather, they may be used to the greatest advantage, especially when given very

early in the disease, and upon the first sensations of uneasiness in the stomach.

Blood-letting is a remedy, which some have totally excluded from the treatment of fevers, because they might have sometimes seen it improperly used ; and others, from having seen it produce very good effects in some people, would hold it to be an universal remedy for this species of diseases : but experience will shew that both these opinions are equally erroneous, and that truth lays between them ; for it is only by experience in such cases, and an accurate and attentive examination of the patient, that it can with any degree of propriety, be either advised, or withheld : therefore it is the state of the pulse, and other appearances, with that greatest of all blessings, common prudence, which is principally to be depended on here. A hard, quick, or tense pulse, pain across the bottoms of the orbits of the eyes, a burning heat at the stomach, and a flushed countenance, are the common symptoms which indicate the use of phlebotomy, especially if the patient is young, robust, and of a full habit. It often eases the head-ache, pain of the eyes, and burning in the stomach, before the operation is well finished ; and it may be repeated occasionally, unless there is danger of over weakening the patient, and inducing a low fever, with exhausted strength, and tedious recovery, as often happens from an unguarded, and imprudent use of it : or what is worse, it has often been used to such a degree, in the height of the fever, as to exhaust the patient's strength, to such a degree, that as soon as the violence of the fever was over, they have died of inanition, by more of the vital fluid being lost, than they could spare with safety. For no one would deny that a person in a fever, as well as out of it, may be bled to death ; yet a particular class of practitioners, have carried phlebotomy to such excess, as though they had no idea that such an occurrence could happen. But this is of a piece with random practice in other respects ; for although the operation is not new, yet in a particular disease, it is always a discovery of some import, to determine its propriety. But it is not wonderful, that the same persons should be equally lia-

ble to take the two extremes of any thing, when they have not a sufficiency of judgment, or reason to discover the happy medium, where truth and rectitude are generally to be found; for nothing but practice, will ever enable a person to judge of the pulse, with accuracy; and particularly the practice of medical surgery, which is the only means, by which any thing just or true can be learned in the healing art. But sometimes a depressed pulse, does not appear to indicate bleeding, although it may be very requisite, and the pulse would even rise in the operation. This is most apt to happen in plethoric, and phlegmatic habits, who have but little nervous mobility.

Purging is another of the methods commonly used, in the treatment of remittent fevers, and one of the most generally useful of any; for a state of costiveness even in health, often causes a feverish disposition, as the irritation produced by the accumulated feces, always does. But it must be much more hurtful in fevers, by increasing the irritation: therefore evacuating the intestinal canal, by mild laxatives, must be very proper in all fevers, and experience shews it to be generally useful. Where the disease is accompanied with an inflammatory diathesis, castor oil, or the neutral salts answer best of any, by their cooling, sedative properties, taking off the inflammatory symptoms, or at least allaying them. The common salts, rochel salts, vitriolated tartar, or phosphoric salts, &c. answer very well; and to any of them may be added manna, soft sugar, or molasses, as they are all nearly the same in their operation; and a little vinegar, or lemon-juice to make them less nauseous, and prevent their being thrown up by vomiting; any of these may be repeated occasionally, every two or three days, through the course of the disease, with advantage; or if the stomach should not be able to bear them, injections should be given of a laxative, cooling quality, made of vinegar and molasses, &c.

In other cases, where the inflammatory symptoms do not run high, and the fevers are more of the low type, the resinous, and more drastic purgatives may answer better, as jalap, ground with a little loaf-sugar, to prevent its griping the patient, or two or three grains of calomel may

be used for the same purpose with the jalap, if it can be ascertained that there is no topical inflammation; for if there are, the stimulant properties of calomel, would make it a dangerous medicine; as it stimulates the whole system, and urges phlogistic inflammation on to suppuration, and abscess; a circumstance we have repeatedly known to happen in such affections, in which the empirical use of mercurials have been unfortunately too general, of late years, in many parts of the world, whether the affections were acute, or chronic. But although they, and other drastic purgatives, answer well to clear the biliary ducts, and intestines, where there are nothing of an inflammatory diathesis, and to remove the irritation caused by stagnant bile, or *scæces*, by carrying them off, and producing another action of their own, and opposing the disease, where the constitution is capable of bearing such conflicts.

If the disease is accompanied with a simple lax, without any great pains of the intestines, or tenesmus, rhubarb or some other mild laxative, will answer, by evacuating the first passages, and by its strengthening, or astringent qualities, putting a stop to the lax; especially if it should be weakening the patient.

Sudorifics, are another class of medicines much used in remittent fevers; and when well managed, are very useful, either in alleviating fevers, or shortening their periods. The best substance of this class, is the antimonial powder; four or five grains of it may be taken every evening, or oftener. Tartar emetic has been much used for the same purpose, and we have been in the habit of using it, for many years, and in all imaginable varieties of forms—but ever since the antimonial powder has been prepared at the apothecaries hall, we have found it answer much better; and can safely recommend it as more certain in its operation as a sudorific, and febrifuge, and not near so apt to vomit, which in an irritable state of the stomach, is a very desirable property, in most species of remittent fevers. But emetic tartar is not such a certain sudorific, in any way it is used, or divided—many other preparations of antimony have been used with the same



intention, particularly a tincture of the glass of antimony in wine, (*vin. antimoni.*) It is a very convenient form when wanted in a fluid state, and in divided doses, by drops instead of weight, but the strength of it is not uniform, on account of the varieties of the wine, with respect to the quantity of acid, and spirit it contains. On which account, it will dissolve more or less of the metallic part of the antimony; therefore, different parcels of it are seldom of the same strength. *Ipecacuanha* has sometimes been used for this purpose; but it does not appear to answer well, unless when it is proper to combine it with opium; as in the clovars powder, (*spirit of mindeneri*.) vinegar saturated with the salt or spirit of hartshorn; or the saline draught, likewise, have been used, as they are cooling and diaphoretic—the *mindererus's* spirit is a very powerful addition to the antimonial powder, and the saline draught is sedative, and laxative; and both may have their proper indications to answer by turns. Under this head it may be proper to take notice of pediluvia, and the warm bath; both of which are very useful in relaxing the skin, by removing the stricture from it, relieving the head-ach, and moderating the fever; but which ever of these may be used, warm diluent drinks are absolutely necessary, and keeping warm covered in bed, in order to promote their effects, otherwise they will only torment the patients to no purpose, causing nausea, and sickness, scarcely producing any other effect. The methods of promoting a diaphoresis, formerly in use, by heating stimulants and cordials, and the like, are very improper, especially where there are any inflammatory diathesis.

With respect to calomel, as a sudorific, a purgative, or an universal panacea in fevers, which has made so much noise lately, and resounded from east to west—from India to Europe, and thence to America, and back again with a redoubled echo; we shall only observe, that the use of it in remittents is no discovery of this age; for it was well known to Lancisi, Huxam, and many others, ever since the days of Paracelsus, its first notorious advocate, as a vermifuge, a purgative, and a febrifuge; so that a discovery so very important as this, has been supposed

was not left for the present age, although a great number of its abuses were. For where any particular part of the viscera is inflamed, calomel, or any other preparation of mercury, (especially when given in such enormous doses, as we lately hear of,) will almost certainly, by its universal stimulant properties, cause suppuration and abscess. But those who are qualified to use their reason, will know how to make a proper use of this medicine; and those who do not, may make a very bad use of any other active substance; but particularly of such as this is generally known to be.

It may be proper in this place, to take notice of sedatives, and antispasmodiacs. The chief of them which are used in this disease are opium, and camphor. Opium is of no use towards forwarding the cure; but is very often hurtful, by causing costiveness, and increasing inflammation where present; it should only be used in cases accompanied with want of rest, in the night, with erethism. And where the fever is of the low irritable variety; opium and its preparations may be proper at night, in order to allay the erethism, and procure rest. But we have sometimes seen opium fail of producing these effects, especially in those of very irritable and weak constitutions; but it is a very happy circumstance, that where opium fails, camphor almost generally succeeds—from ten to twenty grains of it may be used, two or three times a day, either in the form of julep, or simply ground with sugar, and exhibited in the form of a bolus. It is our duty to recommend camphor, for the great relief it once afforded to myself, and often to others under my care, in the low irritable state of fevers. My own case was in my third voyage to India, at Fort Marlbro' in the year 1790, being taken with a fever, accompanied with very great irritability, particularly of my stomach, which could not retain any thing stronger than water gruel; for weak wine and water vomited me immediately: and so also did Spt. Mindereri. Saline draughts stayed with me, but did not produce any visible effect—an almost constant, and violent head-ach tormented me three nights and days successively—opium could not procure any rest, or remission of the

fever, but made me rather worse; a blister was applied between my shoulders, but without any material relief—though rather useful than otherwise. In this situation having sailed from Fort Marlbro' for China, the day when taken, my situation was distressing; the violence of the head-ach was so great, as to make me sometimes delirious in the night; but when there was any person to speak to, by fixing my attention to any one subject, my recollection returned. My mate was quite inexperienced in the treatment of such diseases, and my great fear was that of becoming altogether delirious, so as not to be capable of directing my treatment. Having hitherto always prescribed for myself, and often for others in dangerous situations; and often requested my mate to read some parts of my books, which described symptoms, and diseases, similar to my own. In this situation camphor was thought of, one drachm of it with a few drops of spirit, was rubbed with sugar, and mixed with vinegar and water, of each four ounces, which was all taken in twenty four hours. From the first, it was grateful to my stomach, when scarce any thing besides would stay on it, unless gruel, with a little wine and sugar; which to my taste then was the greatest luxury on earth. From the beginning of the camphor, my recovery was gradual, although very tedious, and in two or three days began the use of bark; but about a week after was thrown into an ague, as was supposed by drinking bottled porter, which was a little flat. It was soon got over, but my strength did not return altogether, until we were some time in China.

There was much reason to think this fever was partly caused by dissecting a man who had died of scirrhus lungs, without the usual precaution of oiling my hands, on such occasions, while the body was warm. For ever from that until taken ill, a constant thirst and feverish like, hectic heat, and uneasiness attended me, not without expecting a confirmed consumption.

Another case was in Mr. Cooper, our fifth mate—he was exhausted, and very irritable; he talked incoherently, for two or three days and nights, and seemed quite delirious; but when any person was with him, he would

answer a question sensibly; opium seemed to increase these symptoms; spirit of mindereus, and antimonials, were tried without any good effect. In this situation we had recourse to camphor, with the happiest effects; for in a few hours he got easier. He lay quiet and slept comfortably, spoke only when necessary, and took drink when offered to him; and a gentle diaphoresis appeared all over him, and he recovered gradually. Both these cases were attended with a constant erethism, or morbid sensibility—nothing can set the virtues of camphor in a stronger light. We have since used it in similar affections with as great success on this continent.

Blisters are very often used in remittents, as well as in other cases of fevers; they are thought to produce their best effects, by the sensations they excite, overcoming the diseased actions caused by the fever, as a greater sensation overcomes a less. But however they act, they are often of great use, either in overcoming local inflammations, or morbid irritability when applied directly over, or near the part affected: as in violent head-aches, or delirium, applied between the shoulders, or in case of great pain, and uneasiness of the stomach, with a constant vomiting; applied to the pit of the stomach, they are often of service; and by the stimulus they give to the skin; they are often useful in promoting a crisis, by taking off the uneasy irritation internally, especially in the low species, or stages of fevers. But we believe they are improper where there are a general inflammatory diathesis, accompanying fevers of any species; because if the inflammation is general, any thing increasing irritation, will add to its violence, and may produce suppuration, gangrene, &c.

The Peruvian bark, is another medicine of great importance in remittent fevers, it appears to produce its effects, by fortifying the constitution against the low spasmodiac irritability, which keeps up the habit, or the disposition to feverish paroxysms; from its tonic powers, strengthening and bracing the whole system of vessels, and moving parts; it is particularly useful in diseases of a lax, weak, and irritable habit of body; and in most diseases



where the patients are much reduced, to a weak, languid or irritable condition: but it is inadmissible, where there is a strong, plethoric, and inflammatory disposition, and consequently never can be necessary, at or near the same time with phlebotomy, for where the one is indicated, the other is improper; for weakening and strengthening the actions of the body, never can be necessary at the same time, although they may be both necessary in different stages of the same disease. For in remitting, or other fevers, there may be so much of an inflammatory disposition at first, as to require bleeding; and afterwards the bark also to compleat the cure, by allaying irritability, &c.—We have seen a violently rapid inflammation, caused by the prick of a needle, in the extensor tendon of the index finger, in an old, irritable person, successfully treated by wine, bark, and opium, in full doses, with fomentations and poultices. Here they must have acted by obviating irritation and allaying irritability, or rather in strengthening the system, against the irritating cause, where no other method could succeed; for evacuations were inadmissible through weakness.

Bark is likewise of great use, after a fever is overcome, in restoring strength and appetite; and is often used for this purpose—being a medicine of great efficacy, and one of those edge-tools of medicine, which the ignorant should not make free with; but it is often abused, by applying it to improper purposes, and adapting prescriptions to the names of diseases, and not to their states. The first introducers of it were intemperate in its praises; whilst others, either through prejudice, imperfect experience, or mistake, have totally condemned it—but in this, as in all other extremes, they are both wrong. But what seems unaccountable is, that although bark has been known for about 150 years in Europe, as a medicine, there are many contradictory accounts of its effects, even to the present time. On the continent of Europe, it is very little used, and even in the Netherlands, where they have agues, and remittents, annually; but even in Britain, one practitioner will, in a most unqualified manner pronounce that bark, wine, and opium, are specifics in all fevers, and

in all their stages; because perhaps they had seen some low nervous fevers cured by them, or others which were only kept up by irritability, after the inflammatory stage was gone.

Where there is great weakness, and irritability of the system in fevers, bark is in general proper, as it imparts strength, and firmness, and takes off irritability, and strengthens the habit of body against the disease. But when there is phlegmonous inflammation present, it is improper; although it often succeeds in the erysipelas.

From what has been said, of the use, and abuse of the most powerful, and best medicines in remittents, every one may judge for themselves, and if they are experienced in judging of different constitutions, and the effects of medicines, they will seldom be at a loss in determining what is best to be done. But there are some difficult, and intricate cases, which occur in practice, where the true species, or type of the fever, may be difficult to ascertain; and in these cases, we would advise a close attention to the appearances, and symptoms; and those who are possessed of a sufficient degree of medical philosophy, will seldom be at a loss which course to take, either to relieve the symptoms, or to cure the disease in temperate climates. But where the progress of the disease is not very rapid, the progress of nature may be observed, and the means she uses to cure, may be promoted, whether by urine, or perspiration. But such timid practice will not do so well, in warm climates, nor often in the autumnal diseases of the temperate ones, especially on large continents, where the heats of the summers go to so much greater excess, than they ever do in islands. Therefore, we must in these cases, be more quick in determining and acting with firmness, and circumspection, and oppose every symptom in its first appearance, and not delay for concoction of humours before they are discharged, although there may be an inflammatory disposition to reduce, before bark is admissible.

To conclude—If the patient is of a strong, plethoric constitution, with a tense, hard pulse, or an appearance of an inflammatory diathesis, bleeding may be necessary;

but in order to determine upon this, we must judge of the patient out of the paroxysm ; for in it, the pulse is always very quick, tense, and full, and the operation may be directed by the symptoms. After bleeding, if necessary, it may be sometimes proper to give an emetic, to clear the stomach, especially if there does not appear to be any inflammatory, or increased irritability ; but if that is the case, it is better to carry off the offending matter downwards, either by mild laxatives ; or this intention is sometimes answered by the antimonial powders, at the same time with their sudorific action ; for they vomit and open the bowels, as well as promote a perspiration. But if the patient is costive, as is commonly the case in fevers, with a vomiting, or great irritability, or inflammation in the stomach, then injections must be had recourse to, as purgatives in this case would not stay on the stomach.

The antimonial powder is one of the most generally useful, as a febrifuge, with warm diluent drinks, and mild laxatives ; and in case of restlessness, small opiates may be given with it at night ; and in case the opium will not procure rest, as is sometimes the case, or when the antimonial will not rest on the stomach, to produce any effect ; then camphor may be had recourse to, in order to allay the irritability of the system, sometimes with the best effects. And blisters may sometimes be of use, to relieve the head-ache, or the low comatose state of fevers : when applied between the shoulders, they may be of great service, or upon the pit of the stomach, in case of great uneasiness there, or over any local pain, or internal irritation. And as soon as all appearances of an inflammatory diathesis is over, the bark may be had recourse to, with wine, or other cordials, to take off the irritability, and strengthen the habit against the attacks of the disease ; but in some young people, if they are not much weakened by the disease, bark may not be absolutely necessary, although the recovery without it, will be more slow than if they use it.

In the recovery from a fever, we must be very cautious of indulging in excesses of any kind ; but particularly,

against getting cold, for fear of a relapse; for the body is commonly left in such a weak, irritable state, so that a small alteration may affect it: but these precautions should not be over strict, as one may err on that side likewise.

The salutary effects of cold air, and of cold water, have lately been highly recommended, in the low typhus state of fevers; but although they are not long in use in modern practice, they have been often misapplied, in common with every newly discovered remedy, by being indiscriminately recommended and used in some cases; but this is only an old remedy lately revived.

In the beginning of fevers, and where there is an inflammatory disposition, we believe we may rest assured, that cold water used either as drink, or in the way of cold bathing, is very improper; for although cold applied to any part of the body, appears to operate as a sedative at first, yet as soon as the first impression is over, there is a glowing heat, from the vital energy being accumulated by the cold, and as soon as that is removed, the solids act with a redoubled vigour, and increased energy, and hasten inflammation rapidly. And from this constant effect of cold bathing, it is easy to understand its effects in the languid, and depressed state, which supervenes in the advanced stages of most fevers, when a low irritable state comes on, and bark, wine, or opium are proper; then there is no doubt, but cold water, as drink, and also cold bathing, or even washing the face and hands, or the feet with cold water, may be useful, in removing that state, which so much depresses the strength, and keeps up disease. And cold air, as being an inferior degree of an application, of the same nature, may be of advantage—under the same circumstances, a constant continuance of a temperate air, may be much better in inflammatory diseases, than either warm or cold air, as we see exemplified in the small pox, and measles. But when it goes below an agreeable temperature, the energy is accumulated; and exposure to a warm temperature, will stimulate the system into strong action, and heighten the inflammatory disposition greatly.



There are several cases on record, where cold air, and cold water have been of eminent advantage in fevers; but all of them are in those, which had continued for some time previous to the application of cold; and of consequence, even suppose there had been an inflammatory diathesis in the beginning of the disease, it was worn off by that time, and the low, feverish irritability only remained; for which the application of cold would be very proper, by adding vigor to the vital functions after its use. But others, unfortunately, on hearing of the advantages gained by cold bathing in fevers, applied it indiscriminately, in the beginning, or the inflammatory stages; and so applied, it would certainly do harm, by heightening the inflammation—as it is said the North-American Indians do with their children, when they are taken with the small pox, they plunge them into water, to cool the heat of the fever; and by that means heighten the inflammatory tendency of the disease, and cause it to be very fatal to them. The same practice is followed by many other uncivilized nations, and with the same effects.

The giving of cold water to drink, in fevers, is said to be a common practice in Spain, Italy and in Sicily, and many other warm countries; and even ice water: but if they give it indiscriminately, is certainly often hurtful; but with the proper precautions it may, there is no doubt, be of use; for their fevers there, must of necessity, be sometimes accompanied with an inflammatory disposition, and then cold water and ice, would do harm, by aggravating the inflammation; but when that state is over, it may be of use; and there is no doubt but in this low state of fevers, its advantages have been established in practice.

Dr. Russel in his history of Aleppo, says, “it is a common practice there, with the native physicians, to firew the leaves of trees in the chambers of the sick, and about their beds; and to set a vessel of cold water by them, with cucumbers in it, with orders to hold one of them in their hands until it grows warm.” This is one way of applying cold in fevers, and probably it may be sometimes of use—wet clothes may be applied to the head and breast,

as is practised by some, and removed when they get warm; this would be a delicate enough way of applying cold water, and may be easily set in practice; but it requires the same precautions as the others, lest it should be used improperly, by accumulating the energy, to break forth with redoubled force.

In order to promote the recovery from fevers, the best effects are to be obtained from a pure air, and gentle exercise, frequently repeated; but not to such excess, as to become fatigueing; for it should cease on the first sensation of uneasiness, lest it exhausts too much, &c. Errors are, however, not so apt to be committed in this respect, as in the total neglect of exercise, in the weak state, which remains after fevers; neither does exercise succeed well, unless in the open country. Walking, or riding is the most powerful, of all known strengtheners, and restoratives, especially for those who are apt to be low spirited. Fresh air, and exercise, answers equally the same, in the recovery from a flux, or other acute diseases, as after fevers. Somewhat relative to this, we have generally observed of people, when taken with any of these acute diseases at sea, or at leaving land, they seldom recover their strength; although they may be three or four months at sea, until they enjoy the land air, which after the tedious uniformity of the sea air, is exceeding agreeable, as a change to persons in a weak condition.

Also, those who have been much weakened by any acute disease on shore, as a flux or fever; even although the air of the place may be tolerably healthy, seldom recover their strength, until they are sent on board their ships, in their convalescent state, and exposed to the pure air of the sea, in case the ship sails soon after; so that even the change of air, change of scenes, and of company, provided they do not get into very disagreeable situations, or bad air, are of more utility than they have often been thought. We can recollect the effects of an uniformity of air, scenes, and amusements, even in health, in the pleasant air, and steady breezes of the trade winds, the uniformity, and sameness of even that pleasant weather, has often been tiresome. So that we have been glad to see a thun-

der storm, or a squall, for sake of the variety, in our tedious voyages, between England and India. And there are sufficient reason for thinking, that changes are of great advantage to convalescents, and should be always had recourse to, when practicable, even although the air should be no better, which they remove to, than that which they left: for the love of novelty, and variety, appears to be a natural propensity in mankind. And there is no room to doubt, but a variety of food and medicines, are as necessary, as a variety of air, in order that the body may not become habituated to any one mode of life; so that a change, when unavoidable, would then be more sensibly felt. Celsus appears to have been of this opinion, as we may see by his short, but celebrated directions for the preservation of health; and the same is very applicable to the restoration of health, and strength. Peruvian bark, or other medicine, if too long continued, lose their efficacy, so far, that even an increase of the dose, does not compensate for the habit. Therefore, one article of any class of medicines, should be changed for another, whose effects are nearly the same—a fortnight is in general, long enough to continue any one medicine, until its place should be supplied with another; and after a week or two, the former may be returned to, in case the disease is obstinate; but larger doses will be required, in order that it may be as active as at first. These rules will be found equally applicable to most of the strong medicines, to prevent their efficacy from being lost, before they have brought about the necessary changes in the constitution.

Where there are not those varieties of weather, which are caused by summer and winter, hot and cold weather, as in the countries between the tropics, those who are weakened by diseases, find the greatest benefit by removing to colder countries, or to elevated, mountainous and hilly situations, if there any are such in their neighbourhood, for the recovery of their strength. This is often practised by those who reside in the East, or West Indies, and always with the wished for effects; unless they are already too far gone, before they make the change, and worn down with age and diseases; for in this situation they often die

before the alteration can produce any good effect. But those who are young, or middle aged, often recover surprisingly, by the sea air, even although they may require to be carried on board their ships—in the course of a few weeks they often grow strong, before they get to the end of their voyage, and acquire new health, spirits, and vigor by the change of air. All these considerations are very much in favour of a change of air, in diseases attended with chronic weakness; particularly in the inhabitants of warm climates. Disengaging the mind from serious pursuits, and anxious cares, is also an object of great importance, in those who are reduced by sickness, as the exercise of the mind, is known to be more weakening, than that of the body. Therefore, leaving the cares of life behind, if possible, should always be practised in excursions in pursuit of health; and this we believe is a very principal part of the cure; and in some cases may be done at a moderate distance from home.

With respect to food and drink, the patient's taste is generally to be consulted. But as patients often consult their physicians, with respect to regimen; and as the physician may sometimes be acquainted with some more suitable articles than the patients, and different ways of preparing them; his opinion may be of some use, even in this matter. Soups, and broths, are commonly very grateful to weak patients; and we know from personal experience, that they may be often taken by a patient, when too weak to swallow any solid animal food, as roast beef, or flakes, &c. Sago well boiled and mixed with a little wine, or sugar, and nutmeg, or cinnamon, is very nourishing to those who like it; and rice pudding is very agreeable, to most people. The choice of animal food, whether beef, veal, mutton, &c. may be left to the patient, as the best directory; for whatever they prefer, generally agrees best with them; and there is no peculiar virtue, or impropriety in one, more than another. Chicken, fowl, and veal or fish, are generally preferred by the sick, or weakly people, and commonly answer well.

Much the same regimen, or food, exercise, and air, which is suitable in the recovery from fevers, is also very



proper in the recovery from dysenteries : as bark, and the same restorative medicines, and cordials, as genuine wines, used in moderation, and diluted with three or four times their quantity of water ; and all depressing, or immoderate passions are to be avoided, as fear, grief, anxiety, anger, or envy—for they all have a tendency to hurt the constitution. The depressing passions, by weakening the circulation, particularly in the abdominal viscera, are very apt to cause obstructions in the liver, spleen, and mesenteric glands. For there is nothing more common, than to find obstructions of these parts, in the dissections of those who have died in this way. And we believe they may be oftener the effect, than the cause of these passions.

Some people who are of a very irritable habit, will be put into a vomiting of bile, by a sudden fit of anger, which plainly shews the influence of the mind, over the functions of the liver, and stomach, by the stimulus which is communicated to the liver, from the stomach, and intestines. The cause of this appears to be the sympathy between the other parts of the body, and the stomach ; which is very constant, and visible at most times. Anger produces a diarrhea in some people, and the consent between anger, and the increased secretion of bile are obvious. But after these parts are stimulated so strongly in this manner, by mental or external impressions, their own native stimuli, loses all its power over them, as their energy is exhausted, by the greater stimulus of passion beforehand ; and consequently, as soon as that is removed, they will become quiescent, and inactive. Hence obstructions follow, and very often scirrhus tumors, and irresoluble induration ; either the violent, or depressing passions, are not only unfavourable to the recovery from fevers of different varieties, but they also very much conduce to bring them on, as low living, and depression of spirits, fear, and anxiety, are very apt to expose those, upon whom they prey, to be attacked with infectious fevers, of the low nervous species ; which rages in hospitals, prisons, ships, or close, and ill aired manufacturing towns, in the habitations of the poor. And the remitting fever, and

dyſentery, when they are rendered infectious, as they often are by confined air, in ſuch places likewise, are more apt to attack people who are depressed in the same manner, as Zimmerman observes.

Here is a case of the remittent fever, as it appeared on the west coast of Sumatra, near Fort Marlbro', the most unhealthy settlement of the East India Company; it is mostly a woody, and uncultivated country.

Royal Charlotte, February 4th, 1785—John Greene, caulker, aged 30, was on shore, assisting at having the company's pepper weighed, and sent on board, which we were receiving from the resident factor, at that place—before this, he was healthy, and temperate in his way of living, and had been bred to the sea. On the evening of the third of February, he came on board, sick with a fever, with which he was taken two days before, but could not sooner get on board, the weather being stormy; his pulse was weak and rather slow, his countenance pale, and he was affected with lassitude, and pains all over his limbs, and body, and an obtuse head-ache, and dry tongue, with a bitter taste in his mouth; he had an emetic in the evening, with directions to promote a perspiration by warmth of bed, &c. On the fourth he was first seized with a violent pain of his head, which was soon succeeded by a purging, and vomiting, and we supposed he was taken with a flux, as it had been very prevalent with us for some months before on that coast—he had an ounce and an half of glauber salts; and in the evening he had sixty drops of antimonial wine, and as much paregoric elixir, to be taken at twice. On the 5th he appeared easier, and had rested well in the night; his lax at this time was not much trouble to him; he had antimonial powders every four hours, during the day, and at night he had fifteen drops of laudanum, and forty of antimonial wine.—9th, the symptoms were all much abated, and there appeared a remission of the fever; but in the fore part of the night, he had a paroxysm for some hours, and it had again returned towards morning, but only remained for a short time—by this we learned that we had an irregular remittent to deal with. The 5th day

of the disease, and the third from his coming on board, he had a decoction of bark, and Port wine, four ounces every two hours during the remissions; and in the paroxysms, four grains of antimonial powder, every three hours—7th, the lax was abated, he went on with the bark and wine during the remissions; after which he had one drachm of the powder, in a glass of wine and water, every two hours, as he was much reduced in strength, yet it stayed on his stomach—he had a slight accession of the fever in the evening as before, but no more of the morning paroxysms, and appeared to be getting better, but as he was somewhat costive, he had a few grains of rhubarb, and went on taking the bark and wine.—9th, the same until the afternoon, when from what cause we could not discover, he was seized with a pain of the head, and sickness and oppression at the stomach, and dimness of sight, and great difficulty of breathing; the extremities were cold, and his countenance was pale, like that of a dead person—in this extremity his feet and legs were put into warm water, and well rubbed with coarse woollen clothes, and he had a draught of half a drachm of cordial confection, and ten grains of salt of hartshorn, in two ounces of simple cinnamon water, and was put into his hammock again, and he had a blister applied between his shoulders, and one to the soles of each of his feet. He actually appeared to have departed, and was for some minutes without any appearance of life—his pulse became again perceptible; his recovery appeared rather miraculous, the vital spark seemed to have been totally extinguished, his extremities gradually recovered their warmth, and his countenance assumed a more lively appearance, and in the evening he complained of no other pain, than that caused by the blister on his back; but he was extremely weak and faintish. On the 10th, he complained of not being able to sleep, by reason of the pain of the blisters, on his back, and feet, which had raised and discharged well. On the 11th, he had no more return of the paroxysms, of the fever; he appeared more lively, and his pulse quite regular, but his feet were much pained

by the blister, and he was directed to take the bark in as large quantities as his stomach would contain, in decoction with wine. On the 12th, he continued to get better, the blister on his back continued open, and discharged very well, and he continued the decoction and wine.—13th, he had no more feverishness; he continued the use of the powder, of bark and wine, in smaller quantities, with some doses of rhubarb, to obviate costiveness, at proper intervals, until the 21st, when he returned to duty.

The case following, will set the premature use of the bark in the remittents of hot, and unhealthy climates in its true light; but such was the fashionable practice of the times, principally from paying too great a deference to the opinions of some late practical writers, particularly Clegghorn, Clark and Lind, who are by much too unguarded in their recommendations of bark, at an early stage of these fevers, to the destruction of many whose physicians too implicitly follow those practical writers, as they were all men of some respectability.

January 4th, 1785, Joseph Dingley, aged 18 years, of a very meagre habit of body, he had been at sea most part of his life; his employment being in the galley—he was generally very dirty in his clothing. He first complained of great pain in his head, and loins, he was very hot, and thirsty, pulse very quick, and his tongue furred. As bleeding was almost totally condemned at this time in warm climates, even in the most robust and inflammatory dispositions; the state of the fever was the only use to be made of feeling the pulse. He had powders prepared from tart. emet. every two or three hours, with barley water for his common drink; and at bed-time a small anodyne draught.—5th. He had an imperfect remission, and a paroxysm about the same time as the day before, but less violent: as his stomach seemed to be foul, he had an emetic, after the accession of the fever was over, and one scruple of dovers sudorific powder at bed-time, and had some rest, and was better next day.—On the 6th, and third of his disease, he appeared in the morning to



have a remission, and was set to the use of bark, a drachm of it every two hours in port wine and water, equal parts; so that by the time of the evening accession of the paroxysm, he had taken an ounce of bark, and probably too large a proportion of wine: the paroxysm continued with increased violence, for upwards of two hours, and at night he had another dose of Dover's powder.—7th. He continued the use of the bark and wine; at four in the afternoon, the paroxysm came on very violently: on the accession he got some of the antimonial powder, but he had no proper remission, after this severe fit; he had again a little of the Dover's powder at bed-time, but was more feverish all night than before.—On the fifth day of the disease, the pains of his head, and back, and the feverishness in general was somewhat abated; he was now set to take bark more frequently—a drachm of it every hour in wine and water; but at noon he began to nauseate and to vomit it up again; his pulse now was very quick and small; he left off the bark, and had a blistering plaister applied between his shoulders, and every hour or two, half an ounce of lemon-juice, saturated with the vegetable alkali, in an ounce of simple cinnamon water, and four grains of antimonial powder; but at four in the afternoon, he was taken with a rigor, which lasted until six, very violently; he became delirious, and was convulsed, his pulse was 120; his feet and legs were put into warm water, and well rubbed and bathed, and afterwards covered up in his bed; but he departed at seven—he was excessive hot just before he died, and we could feel the electric pungency, on feeling his pulse. He never could be brought to perspire freely, and soon became very putrid. The body was so very offensive next morning, that some of the seamen who went near it, were taken with a nausea and vomiting; for which some of them took emetics. The others who died on this coast, soon became putrid also, the weather being very warm, and often rainy at this season, with high winds at times.

*Remarks.*—After having had more experience in the diseases of hot and unhealthy countries, we cannot avoid

observing, that by a different mode of treatment, this boy's life might have been saved ; but this, and some other similar cases, made me more cautious in the early use of bark, and wine, and the large use of them in any cases. It is very probable that if the neutral salts, or castor oil had been given every second day, and antimonials with warm diluent drinks ; for the fourth or fifth day of the disease, is generally as soon as bark and wine can be given with safety, and then a more sparing use of it answers best ; for these remittents of warm climates, when they attack northern constitutions, soon after their arrival, are generally accompanied with an inflammatory disposition, for the first three or four days, and bark and wine heightens it ; but the neutral salts and antimonials alleviate it.

The subjoined case of a remittent fever, is from my last voyage. It will shew the effects of a different method of proceeding, and the utility of practice in these dangerous diseases.

*Wampoa in China, October 15th, 1790.*—James Murray, chief mate's servant, aged 23 years, of an active disposition, never at sea before this voyage, complained of head-ache, sickness at his stomach, and the other symptoms of a fever. He had an emetic immediately, and at night an antimonial draught, and water gruel warm in order to promote a perspiration, and was directed to keep well covered with his bed-clothes in the night.—16th, the fever was much the same, and the head-ache, and sickness at his stomach continued, and he complained of gripping pains in the bowels, and was rather costive ; he had an ounce of glaubers salts, with some vinegar in it to make it less nauseous, and at night the antimonial.—17th, the head-ache was a little abated, and he complained of soreness all over him—his skin was yet dry and shrivelled ; he had antimonial powders three times in the day, with warm diluent drinks, and a few drops of laudanum at night : he was sometimes delirious in the night, but towards morning his skin became soft, and moist, and a perspiration broke out.—18th, he was very low, and weak, and complained of head-ache, his pulse was small, and as he was yet costive, he had a saline purgative ; and in the

evening he was taken with a rigor, and vomiting, and pain at the pit of the stomach; this was succeeded by heat and sickness, &c. and after this paroxysm, he was ordered a decoction of bark, to eight ounces of which, one ounce of the tincture was added, and directed to take three spoonfuls of it every three hours, after the operation of the purgative, and in the absence of the paroxysms.—19th, he began the bark mixture in the night, and thought his strength a little recruited; but the oppression at the pit of the stomach, and pains in his bowels continued. He had another accession of the fever, and a vomiting of bilious matter, accompanied with a hardness and pain of his stomach, and great irritability of it. He refused every thing offered him, either as food or medicines. The last purgative he had, operated three or four times. He had a saline mixture. and tincture of opium, to compose his stomach; and he had a blistering plaister applied to the pit of the stomach, with good effect.—20th, he was much relieved, the uneasiness at his stomach greatly alleviated, and had a perfect remission of the fever; he was ordered six drachms of bark, and two of snake-root, to be taken with port wine and water, in the course of twenty-four hours—he had but a slight paroxysm this day.—21st, he had a good night's rest, and was tolerably free from fever, but very weak; he was ordered to go on with the medicines.—23d, he was troubled with a retching to vomit, but continued to get better; for his sick stomach he had two ounces of lemon-juice, saturated with salt of tartar, and with a few drops of laudanum, to be taken occasionally.—24th, he caught a cold, and had a cough; for which he had an antimonial, but continued the use of the bark, and got well, and recovered his health and strength in a few days.

*Remarks.*—In this case, we may observe the effects of a different method of treatment. Here there appeared not much necessity for bleeding, so far as we could judge by his pulse, and the appearance of the countenance, or other symptoms. The irritability of his stomach did not appear to be great at first, nor any appearance of inflammation: the laudanum given with the antimonial at night, was not so much intended to cause rest, as to assist the an-

timonial in its sudorific operation; but in case the warm drinks, and antimonials cause a perspiration, and removes the stricture, and dryness of the skin, we would rather not give any preparation of opium, in the first days of the disease, at least while the fever is high, or any inflammatory tendency present. As for the antimonials, they are the most generally useful, of any other known medicine, in the beginning of fevers, where the stomach will retain them, even in very small doses. Purgatives are absolutely necessary, as the neutral salts, and castor oil, in the beginning of the cure, as they clear the intestines of their irritating contents, and are of a sedative, or cooling quality; therefore in remittents, or indeed any other fevers, they should scarce ever be dispensed with, every two or three days, where the stomach is irritable. The bark in this case appeared to have been begun soon enough, although it was the end of the fourth, or the beginning of the fifth day; and we are persuaded that giving it sooner, in large quantities, is very seldom safe; but its effects may be tried first, in small quantities, and if it should appear to increase the fever, with stricture of the skin, and uneasiness, it is improper.

A case of a remittent fever which was contracted on shore at Fort Marlbro'. Being taken at the same time with a very dangerous fever myself, and therefore not able to pay attention to him, being unable to visit him only once or twice, and my mind, as well as my body, being in a very weak, and languid state. We regretted this young man's death the more, as he was the only one lost during the voyage, by the diseases of the climate, in a ship's company of 140, in twenty months to St. Helena, Bencoolen and China, one of them the most unhealthy settlements belonging to the company; and China is none of the best to Europeans.

A case of remittent fever, in which wine and bark were used prematurely.

Martin Harris, third mate's servant, aged 27 years, rather of a meagre and irritable habit of body, he had lived at the tavern during our stay at Bencoolen, which was about a month, and sometimes got drunk, but the



whole time he had no bed, but slept sitting or reclining on chairs, and often in the open air, in a piazza, (or *varanda*.)

July 22d, 1790, he came on board very sick, he complained of a nausea, and sickness at his stomach, and of severe pains of his head, and of his back and limbs—his pulse and other symptoms did not appear to require bleeding, his tongue was dry, and a bitter taste in his mouth; he had immediately an emetic, and at night an ounce of vinegar, saturated with volatile alkali, and a few drops antimonial wine, as a sudorific; he had some rest in the night—and on the 23d, his pains were easier, but the feverish sickness still continued, but his pulse was moderate; and as his bowels had not been opened by the medicines, he had an ounce of glauber's salts, with the juice of a lemon to make it less nauseous—and at night again the draught with antimonial powder. On the 24th, he had a perfect remission, and was almost free from fever, but complained of weakness and giddiness, but would not keep his bed—this day, the third from his coming on board, but the fourth or fifth of his disease, he had a fair remission with weakness. He was ordered a drachm of bark every four hours, in wine and water, as a trial of it; but he had a restless night, and was very feverish—and on the next day, the 25th, his eyes were observed to have a yellowish tinge, and he complained of pain and tension of the lower belly; now it was very plain the bark had been given rather too soon; it was also discovered that he had got a quantity of bark and wine into his own possession, of which he took indiscriminately in large quantities—he had glauker salts again, to obviate the bad symptoms arising, and in the evening an antimonial with laudanum.—26th, the yellowness of his eyes was nearly gone, and the tension of his abdomen, head-ache, and feverish heats were abated, and he had a fair remission, but he was very much debilitated, with a slow pulse, and yet he would not keep his bed. He was ordered snake-root, a drachm and a half, cordial confection, two drachms, and simple cinnamon-water, eight ounces, as the bark and wine appeared so

much to disagree with him, to take three spoonsfull, every three hours; he had a pretty good night's rest—and on the 27th, he appeared much refreshed, but towards noon his paroxysm came on again, with great thirst, and a full pulse, and his skin was hot and dry, then he had saturated vinegar, half an ounce, tartar emetic, half a grain, and ten drops of laudanum, to be taken in the paroxysm, in order to promote a perspiration, and lower the fever——28th, on this day, he was very low, and his pulse scarce perceptible, his tongue foul, and being rather costive he had a purgative, which did not operate at this time; (being unable to see him myself,) he had also half an ounce of bark, to be taken in wine and water, as he was so very weak, and had a good remission.—29th, as the purgative did not operate, he was ordered an injection; he had taken about three drachms of the bark, and a little rhubarb, and probably too much wine, as the other servants were very officious, giving him whole bottles of it at once, which he kept hid in his hammock, and drank of to excess; but at seven in the evening, he was taken with a violent paroxysm, and became delirious, with starting of the tendons—he was ordered a blister to his back immediately, and his feet to be bathed in warm water, and he had camphor, five grains, with cordial confection, and five drops of laudanum, in a draught, but he soon became convulsed, all over his body, and continued so until four in the morning, when he departed.

We were informed that the ill-timed kindness of those about him, was a principal cause of his death; though they did it with a good intent.

A case which proved very tedious through the patient's misconduct at Bencoolen.

July 10th, 1790—Mr. Prescott, midshipman, of a sanguine habit, aged 18 years, he had lived more freely than ordinary, and sometimes sleeping without going to bed all night, and at other times walking, or riding out, exposed to the burning rays of the sun. He was first taken with sickness of his stomach, and pains in his head and back, and in all his bones, and other symptoms of fever; whilst on shore, he applied to the surgeon of the settle-

ment, who first gave him an emetic, but no blood was taken, although he required it; after the emetic he had saline mixture, and the bark had been sent to him, but fortunately for him, he had not taken any until he came on board, by which time he had been three or four days bad of the disease. 10th, when he came on board he was in a high fever, his tongue foul, and of a brownish colour; he was very thirsty, and with griping pains of his bowels, and every second day he had an exacerbation of the fever, he had half an ounce of rochel salts, and afterwards half an ounce of Mindererus's spirits, with half a grain of emetic tartar, every two hours, through the day, &c. 11th. the fever was much abated, but he complained of weakness and langor, and his tongue was foul and brownish; he was now set to take the bark, a drachm every three hours in wine and water. He had an accession of the fever in the night, and in it he had an antimonial, with a few drops of laudanum. 12th, he continued the bark in the remission. 13th, he was much better and went on with the bark; had another accession of the fever in the night, and had then an antimonial with laudanum. 14th, his fever was milder last night than the former accessions, he now complained of uneasiness at his stomach, for which he had a gentle emetic. 16th, the paroxysm was scarce perceptible; he continued the medicines, &c. 17th, he was so far recovered, as to be able to get out of bed, and walk about a little, and took some of the bark, &c. 19th, he went on recovering gradually, and now left off the bark, as he all along had a great aversion to it, and could not be prevailed upon to take it regularly—he recovered, although but slowly. On the 28th, he suffered a relapse from sitting in the great cabin, exposed to a current of air, and eating unripe fruit, and drinking porter. His skin became dry, his pulse weak, he was restless, captious, and troublesome, and could scarcely be prevailed on to take any medicines—he had an antimonial, with a few drops of laudanum at night. 29th, he was observed to have a swelling of his feet, which he concealed, his fear of taking medicines was so great, and as this indicated obstructions of the abdominal viscera, he had

three grains of calomel in a pill at night. 30th, he had no fever, but was very weak, and low spirited, and had a great aversion to motion, he was ordered a drachm of bark, three times a day, and at night two grains of calomel, in a bolus. 31st, It was very difficult to get him to take one or two doses of bark, at eight in the evening by sitting up, he became faint, and was carried to bed.— We were informed that he had drank too much bottled porter before this attack; he now became highly delirious, with a burning heat of the skin, as the bark had vomited him, he had left it off before this fit came on, and having symptoms of obstructions in the abdominal viscera and swellings, &c. he had pills of calocynth, comp. and tartarised antimony, half a grain.

Aug. 1st. He was free of the fever, and perspired freely, he lay however, in a comatose dozing or sleepy state, unless when roused from it; now he had a blister to his back to rouse him from this lethargic state, and as he was costive, he had a pill as before, every three hours— 2d, he appeared a little livelier ever since midnight; he had two or three evacuations in the night, but he was very weak and irritable, he therefore had half an ounce of bark with wine and water; the swellings of his feet were almost gone. 3d, he rested well in the night, and appeared to be getting better very fast; the blister discharged freely, and the bark remained on his stomach better, and his appetite began to return. 4th, he was entirely free from the fever, and a little eruption appeared about his mouth; he was now again, so far recovered as to be able to sit up a little; he rested well last night: as he could not be got to take much bark, he had one drachm of it, with half a drachm of snake-root, in wine and water every day at eleven o'clock until the sixth, recovering slowly, when he left it off.— On the 8th, as he had been costive for some time, and the swelling of his feet returning in the evenings, and pitting when pressed upon; he had one scruple of purging pills, and calomel two grains, made in four pills to take at bed time. 10th, he continued to get better, but the swellings continued, he had the same pills repeated. 13th, he continued recovering, but the swell-



ing of the feet continued, and he had the pills as before.— 18th, he was taken with a pain of the stomach, nausea, and inclination to vomit; he had three grains of emetic tartar immediately, and the next morning, 19th, a purging draught: after the emetic the swelling about his ancles lessened considerably, but he became much weaker—he had another feverish paroxysm in the evening: this was his third relapse, and there were sufficient reason to think, this was likewise caused by intemperance, and his aversion to the bark. In the night he had a hot and dry skin, and a hard quick pulse, he had seven grains of antimonial powder, and twelve drops of laudanum.— 20th, the fever was entirely gone, but left him very weak, and the swelling of his feet, was totally disappeared—he had therefore half an ounce of bark ordered for him, in wine and water, but he had the most insuperable aversion to it, and used every means, and excuse in his power to evade it, but he was forced to take about five drachms, (much against his will,) by watching him, for he would even conceal it in his mouth, and spit it out as soon as our backs were turned. 22d, as he begged a respite from the bark yesterday, he had no medicines, but this day he was forced to take a little in wine and water, at eleven o'clock, and from this forward he took no more medicines, and recovered. 27th, by this time he was entirely in good health. We were now one week in China, and he has been sick, since a week before our leaving Bencoolen, in all seven weeks.

*Remarks.*—It is to be observed, of this young gentleman, that he was very much of an epicurean, in the modern acceptance of the term, and he was remarkably impatient under his sickness, which always aggravates the danger; and as he had the command of money, and was very fond of every gratification, he would not refuse himself any thing, nor undergo the discipline of taking medicines, or of being confined to any regimen; which with his uncautiously exposing himself, when weak to the night air, without exercising, as walking, &c. at the same time aggravated his danger. Between the first and second relapse of the fever, he was in good health, only weak,

and his aversion to the bark, deprived him of the advantages, which he might otherwise have derived from it, towards the re-establishing of his strength; the swelling of his feet, and the primary cause of it, obstructions in the abdominal viscera, were more probably owing to a deficiency of the bark, than to over much of it, as he never took so much as was ordered for him. At the time of his third relapse, his case appeared to be very hopeless, but his recovery was very perfect, in all respects.



*The Typhus, or Low Nervous Fever.*



**T**HIS Fever is generally first perceived by an uneasiness, and sickness of the stomach, and a head-ache and pain, chiefly over the eye brows, with a vertigo, and pain of the loins, and sometimes in all the bones, and joints of the body, with a nausea, and bad taste in the mouth; and the tongue is at the beginning, covered with a white furr, which, in the progress of the disease, turns brownish; and the teeth are sometimes covered with a blackish colour, and there is a great thirst, and bad taste in the mouth.

The pulse, in this species of fever, is commonly quick, and weak, from 110 to 120, or 130 in a minute. In some it is hard, and tense, with a pain across the bottoms of the orbits of the eyes; there always is a great lassitude, and weakness, and a frequent desire of changing the posture of the body, and limbs; the patients feel as if they were over fatigued, tired, and restless, and cannot sleep; with starting or frightful dreams, which they are often troubled with; the senses of perception are disturbed, and the

memory is confused, and the judgment weak, wavering, and childish; they are often so forgetful, that they cannot remember any thing they are doing, or saying; and if they ask for any thing, they either forget it, or think it very long in coming: and in short all the senses, and faculties are very much perverted, and disturbed; they often become delirious, but principally in the night, through want of rest, or objects to fix their attention—such as speaking to any one, or looking at any object; they often talk to themselves incoherently, often mistaking imaginations for realities; and yet if any one speaks to them, they commonly return a proper answer, or even converse sensibly, for a little, and presently fall into their unconnected reveries, tossing about in bed, sighing, and seeming to be in great distress; sometimes passing several days and nights, without asking for any thing, either to eat or drink, or even wishing to have any thing that is offered to them, in a listless state of apathy, want of resolution and wavering of their minds.

This appears to be in every sense of the word, a continued fever: for it is very rare to see any such thing as exacerbations, or remissions in it for several days, or even for weeks together—its continuance being sometimes very long, and obstinate, weakening the patients excessively, both in mind, and body, if suffered to go on without medical assistance, but which, generally by proper treatment, may be either cut short, or at least caused to be less hurtful, than when left to itself, in the manner of the Antients; as we find by their writings, they mostly did in their practice.

The cure should in general, be begun, by giving an emetic, as soon as the first symptoms of uneasiness are perceived at the stomach; this in some cases prevents the farther progress of the disease, and cuts it short at once, and should never be neglected by those who are exposed to the infection, by being near the sick, upon the first suspicion of their being infected: which may be known by a sickness at the stomach, head-ache, and a peculiar sensation of and dryness of the tongue, accompanied with a prickling sensation in the mouth, and an uncommon sort of

taste, &c. and sometimes a pain of the loins, or of all the bones. But as some persons are very averse to vomiting, five grains of antimonial fever powder, should be taken, in order to clear the bowels, keeping warm in bed, and taking warm drink, to promote a perspiration, and remove the torpor of the small vessels—this may sometimes supply the place of an emetic; but if they have taken an emetic, they should endeavour to promote a perspiration, by getting into bed immediately after its operation, with warm drinks—and if it does not break out easily, a little of the antimonial powder, in a spoonful or two of vinegar neutralized with spirit or salt of hartshorn promotes it.

If there should be any appearance, of an inflammatory diathesis, accompanying this fever, blood may be taken to advantage, in the early stages of the disease, although this is but sometimes the case. Therefore it should be used with caution, and not indiscriminately, and by rote, in every person taken with this disease; but let the pulse, and the appearances of the patient, direct the experienced practitioner in that respect; and if they can distinguish an inflammatory pulse, from others, they will seldom err here. As in all continued fevers, so in this, it is absolutely necessary to keep the bowels clean, by purgatives—if there are any inflammatory appearances, these should be of the lenient and sedative kind, as the neutral salts, Sal. Rochel, or castor oil. But where the disease is of the low nervous appearance, the most drastic, or resinous purgatives may answer better, by stimulating the low, and languid powers into action; of this sort, jalap, rhubarb and, aloetics with calomel, may be used occasionally; but sometimes the antimonial powder, supercedes the use of purgatives, by operating in that way—this powder should be given at intervals of six, eight, or twelve hours, but particularly at bed time, in case the patient is not close confined, as is often the case, at the beginning of this fever. But if they are confined, and the powder will not promote a perspiration, the neutralized vinegar may be given with it, or the common saline draught. These are peculiarly proper, in case of great irritability of the stomach, without any perspiration; and even a few drops



of laudanum, may be added to the night draught, when there is want of sleep; but this should not be made free with at first, as it is apt to produce costiveness, and leave the patient low after the use of it; and in case the laudanum does not procure sleep, or rest, it is very probable that camphor will succeed, if given in doses, of from ten to twenty grains. This in cases of great irritability, is a most powerful sedative, but particularly in that sort of irritability, which is of the low, nervous, or spasmodiac species, in which it answers best; and these distinctions, although very obscure, and difficult to the ignorant, are not so to the experienced and well informed, who have used themselves to these discriminations, by an accurate observation of the progress of diseases.

In this genus of fevers, the brain is very apt to be affected, and the patients in the progress of the disease, very frequently become comatous, lethargic, and delirious. In cases of this nature, blisters between the shoulders, answer extremely well, in alleviating the symptoms, and by their stimulus, removing the atony, and giving energy to the parts. There are some cases however, especially at the beginning of this disease, where there is an inflammatory diathesis—and here, blisters would be very improper; but bleeding, and antiphlogistic purgatives, such as the neutral salts, will be required, with the antimonials, and diaphoretic draughts—as ammonia acetata, (the saturated vinegar) or saline draughts, answer very well in moderating the disease. As soon as the violence of the fever is overcome, and no inflammatory diathesis is present, the Peruvian bark may be given, either with, or without wine; but we do not mean that they should be given in such quantities, as has been sometimes, injudiciously advised by physicians. We believe only small doses of bark, and port, or madeira wine, can be given with propriety in this disease; although some have given bark by ounces, and wine by bottles, &c.

After the inflammatory diathesis of this fever is over, or if no such disposition appears; for even in the most infectious degree of the typhus, the young, strong, and plethoric, are as subject to be taken with an infectious fe-

ver, as others, and an inflammatory disposition often appears, in the first days of the disease, consequently it may require bleeding, and lenient purgatives, and antimonials; but after this stage is over, nourishing cordials, and food, are necessary; or in case it has not appeared in the first days of the disease, then bark, wine, and opium, may be much sooner used with success—a dose of laudanum may be given at night, and the bark and wine may be given, either mixed with water, or separately, but in moderate quantities. We believe from two drachms, to half an ounce of the bark, and from a quarter, to an half pint of wine, will generally be sufficient in the twenty-four hours; and in case great weakness supervenes, nourishing food, and drinks may be administered, as soups and panada with wine and cordials. But the use of these is to be entered into with caution, observing at first attentively their effects upon the patient; and in case the pulse grows fuller, and slower, and more steady upon the use of them, and they do not disorder the intellects, but the eyes become more lively, and the mind more serene, they are to be persisted in: but on the contrary, if they disorder the imagination, or quicken the pulse, or cause it to be more irregular, or unsteady, they are to be used with caution, or left off altogether, for fear of promoting internal suppurations, as sometimes happen in the brain, and other viscera, and then the antimonial powder, and neutralized vinegar, may be given to advantage.

Towards the decline of this, or any other fever, pure air, and gentle exercise, if practicable; and in tedious low cases, the cold bath may be very useful, as it excites that cheerful, healthy glow over the whole body, immediately by its operation, which is apparently of great service, in recovering the healthy actions of the system, or in lessening the morbid actions, whether that is increased irritability or some other better defined action, of the living solids; but irritability of some one name, or other, appears to be a prominent feature in all febrile indispositions, and the cause which excites it, and must be found out, if we would cure successfully.

*A Practical Narrative of the Pestilential Fever.*

THE summer of 1793 was remarkably warm, so that the inhabitants say, they have had few more so, in the memory of the oldest person living; and the wind was mostly from the southward. In June there were some thunder showers; but July and August were dry, with very little wind, and generally warm for the season. This is as near as we can remember; but we have several times seen the thermometer above  $90^{\circ}$ . The greatest heats are between 12 and 3 in the afternoon—at any other time of the twenty-four hours, the heat, to one used to tropical latitudes, is but trifling, if not exposed to direct rays of the sun, and then it is warm enough in the middle of winter. The coldness of the water is a great luxury, to those who are used to the warm water of hot climates, at least to myself it is very much so. The coldness of the evenings and mornings, and the nights in general, are very pleasing after the heats of the days; and this is very perceptible as soon as the sun is down—the pleasant night air invites the inhabitants to sit at their doors, in the cool of the evenings, and often until late at night, on benches, for they have no piazzas, but are mostly exposed to the dews. This custom is more frequent here, than in any other place we have seen, in hot weather, and we believe must be very often prejudicial to their healths; for the vessels on the surface of the body being relaxed, by the preceding warmth of the days, and the fluids thereby invited outward, accompanied with a profuse perspiration, the inward vessels are in part emptied of their contents, and the body is weakened, and becomes more susceptible of every impression; but when the body is exposed to colder air, a stricture appears to be produced on the skin, and extreme vessels, near the surface; and the fluids are propelled to the larger internal vessels, and viscera. If this change is brought about gradually, no bad consequences

ensue, by giving the vessels time to accommodate themselves to the change ; but when made suddenly, especially after being heated by exercise, it may often cause violent diseases, of the dysenteric, or feverish species, according as the season, weather, or habit of body may be more predisposed to one, or the other : thus we most commonly find diseases inflammatory in the spring, and accompanied with redundancies of the bile, and lax fibres in autumn.

When persons expose themselves to the cool evenings, they should use some exercise at the same time, to prevent the bad consequences which sometimes follow ; walking, or any other active amusement, which circumstances may permit. Walking we remarked, was less practised here, than any other places we have seen, unless by the few French, who are here, who were almost the only people, to be seen on the public walks, which was without doubt, much in their favour—no less so, than their modes of living ; for pure air, exercise, and temperance, have at all times the happiest effects upon health.

In July, an epidemic catarrh, was general all over the city. It appeared to partake of the infectious properties of the influenza ; but it was very slight—almost every one who had it, going about their ordinary employments, and very little the worse. It was accompanied by a stuffing of the head, and a discharge from the nose, and the lungs, and all the appearances of an inflammation, of the mucous membrane of the nose and wind-pipe, extending down its ramifications ; and it induced a weakness all over the body, which remained a long time ; the head likewise felt uneasy. The disease however was so slight, that very few applied for medical assistance. As there had been rain several times before this, and heavy thunder showers, it was not much inflammatory, and did very well by evacuating the contents of the stomach and intestines, and giving a little bark and wine or cordials, to restore the tone of the system in general. This complaint was most prevalent in July ; and except the diseases among the children, such as diarrhea,



or dysenteries, which are common every year, there were no remarkable epidemics before August. So far as we can recollect, the state of the air and diseases, for upwards of three months, before the raging epidemic took place.

It is proper to be observed, that the inhabitants of this city, are in general of more robust, and plethoric constitutions, than is common in cities, or in any other places farther southward. Their appearances are such as have been understood by bilious; and as we have shewn the connexion there is, between the colour of the inhabitants of any local situation, and the healthiness, or unhealthiness of the place, to judge from colour, we would not readily take this to be an healthy situation; and so far as we have seen of different parts, this rule holds good generally with the inhabitants of temperate climates. They lose their white, and florid colours, in proportion, the unhealthier the place is in which they live; so that one much used to see this variety, may determine at once concerning the healthiness of any place, by the appearance of the inhabitants. This colour is always in proportion to the deficiency of pure air, and the predominance of inflammable or fixed air in the atmosphere; for when so impregnated, it cannot absorb so much inflammable air from the blood in the lungs, nor impart so much heat, and the vital principle to the blood; consequently, the superabundant quantity of inflammable air, is in such circumstances, retained in the body, and being an excrementitious substance, must be at least a predisponent cause of diseases; but we do not assert it to be an exciting, or active cause.

The low land on the neck, is of a large extent, and certainly a very unhealthy place; between the city and Kensington, is a low place of stagnant water, and dams; beyond Kensington is banked land of a large extent. The Jersey side is low, and we doubt rather unfavourable to health; and about the Schuylkill, are muddy and swampy shores in some places. But the greatest inconvenience, we believe, which this city labours under, is the form in which the houses are crowded together, upon the banks of the Delaware—the streets being all disagreeably narrow, Market-street alone excepted, and it is near half filled with

the market-house, or shambles. The number of lanes and alleys; the small pinched up houses, as though there was not room in the country to extend them back towards the Schuylkill; this is the greatest fault which appears in the structure of the town. We cannot accuse it of dirtiness, in general, but the very reverse. And although we would wish burying places to be out of town, as an improvement in decency; we never knew, nor heard of a well attested fact of their ill effects.

The first symptoms of the disease, was a sense of uneasiness, and sickness of the stomach, which was soon followed by rigors, and a stricture all over the extreme vessels, with a shrivelled appearance of the skin.—Then came on pains of the head, in many accompanied with pains of the loins; some had pains in all their limbs; others had them only in their upper arms, shoulders, or thighs—in many, the first attack appeared like a paroxysm, of an intermittent, with a chilliness, and shivering, succeeded after some hours, by great flushes of heat, and a burning sensation of the stomach: or a chilliness of several hours continuance, was very frequently the first symptom of the disease, with commonly an inclination to vomit; and frequently a constant vomiting, from the very first, which in many cases was a very troublesome symptom, and in some cases, baffled all the endeavours of art to allay it. In many of the most violent cases, they had a violent pain cross the bottoms of the orbits of the eyes, or above them, in the bone, as it seemed; the eyes at the same time, were red, heavy, and dull, and rather stiff in their sockets. In these cases, in which the eyes appeared inflamed, and pained, and a great heat at the stomach; the pulse was commonly quick, and hard, in common from 120 to 130 in a minute—the respiration was at the same time laborious and difficult. Some had evident shooting, or darting pains in the breast; very much like a pleurisy, and would persuade themselves, and their attendants, that this was their disease; but this symptom we never saw, until the weather became cooler—but the affection of the stomach seemed to be the most universal, and constant symptom of this dis-

ease, denoting an inflammation of its coats, attended with vomiting in most cases. And in some, with a burning heat, and pain, from pressure on the pit of the stomach, which in many remained long after the disease, even a month or six weeks after they were otherwise in health ; This primary, and great affection of the stomach, which was never absent in this disease, would appear to be a strong proof, that the infection, was primarily received there, especially as it is known so soon to affect the skin, and the head, whenever it is disordered.

Dr. Huxham, thought infection was of the nature of volatile alkali—because the sailors, who were disposed to the alkaliescent scurvy, were most apt to take the fever, which he denominates malignant, or pestilential ; and which he says, was first brought to Plymouth, by two ships of war, from the Mediterranean ; which there was good reason to prove, was as a modification of the plague ; because the said ships had communication with places infected by the plague, which was raging there at that time. Now hydrogen, as well as vol. alkali, is generated by the animal process from our food, either of the animal or vegetable kingdoms. But in larger proportion from the former, than the latter. And graminivorous animals generate an alkali, from all sorts of vegetables they use. And when we consider that vol. alkali is composed of azotic (dephlogisticated) air, and hydrogen (inflammable air ;) there would appear to be some probability of reason in the idea.

Dr. Balfour supposes the remittents and fluxes of India, are infectious ; and that the infection is first received into the stomach and intestines ; for which reason he calls them putrid intestinal remittents. Because he says, from what he observed of the sick, the mucous of the intestines, was in a putrid state, the absorption of which, from the intestines infected the fluids, and the whole system.

If we were to adopt these theories, both of which we think, have some reason in their support ; we would find, however, that the deleterious substance of infection, however received, first began its operation in the stomach, .

which it inflamed, and did not appear to carry its effects much farther than the stomach, but was communicated to the biliary ducts and liver, preventing the free passage of the bile into the intestines, and causing a regurgitation of it, and a jaundiced appearance: first in the whites of the eyes, and afterwards in the skin—in some, this came on the third, or fourth day, and was in general a mortal symptom, when it appeared before the seventh. In the most favourable cases, it made its appearance between the seventh, and the tenth day of the disease. We do not think the bile being regurgitated into the system, destroyed the patients; but the early appearance of it, shewed a great degree of inflammation in the parts, obstructing its proper exit, by the intestines, which deficiency of bile in the intestines, was probably a cause of the coltiveness; which was very general in this disease, scarce any of them had natural evacuations, and required large, and often repeated doses of purgatives, to produce the desired effect. Whether the infection of fevers is received by the lungs, with the air, which is not probable, because the lungs do not appear to bear any share of the fever, or to be primarily diseased, and indeed they seldom suffer; or to fall upon the pharynx, in inspiration, and from thence to be conveyed into the stomach, with the saliva, and there act on the stomach; and decompose the gastric fluid, and mucous lining of the stomach, which defends its villous coat from being injured by its contents, it would appear to be of an alcalescent nature. But we would not assert that either of these properties are any cause of the disease, or in bad cases whether they are both combined, has not yet been fully demonstrated; neither do we consider it of any material consequence, either in the prevention or cure. Although it is probable in those days of investigation, of the principles which compose the atmosphere; they may be illustrated experimentally, before any distant period. The established use of vinegar, and wine as preventatives, seems to favour the opinion of its alkaline nature; and as there is no probability of its being absorbed by the skin; therefore it would, like other things inimical to the habit, cause inflammation in the glands of the absorbents, which never



happens in the beginning of any fever ; except in the plague ; and we believe they do not come on in the beginning of it either, but after some times continuance ; when we may suppose the absorption has been caused, by the diseased fluids, extravassated, or perspired by the vessels on the surface of the body.

In some the symptoms of inflammation run very high in the beginning, with a violent head-ache, quick, full, and hard pulse, pains in the loins, great heat and uneasiness of the stomach, redness, and pain of the eyes, with a stiffness in their sockets ; accompanied in some with a vomiting—but in all, with a sense of heaviness, and oppression at the pit of the stomach, and an inclination to vomit. In others, it came on in a very insidious manner : the stomach would be perhaps a little uneasy, with a slight pain of the part ; the pulse rather depressed, and perhaps not more than 100, and very little changed, or less strong than in health ; many of these patients were not close confined to bed, but would be up and down by turns, and would scarce believe they had the fever, until after the fifth, or seventh day, when it began to be more alarming, by a delirium coming on in the night ; great weakness and depression of strength, and paroxysms returning irregularly, or every second day, with a yellowness of the eyes ; and soon after, all over the body ; although many died of the disease, on whom there were no yellow appearance, either before, or after death. And here we think proper to mention, that a yellow fever was a very improper name for it, as it was only an accidental symptom, or appearance of a jaundice, superadded to the reigning epidemic, by the obstruction of the natural course of the bile. It was denominated malignant by many ; neither do we think that epithet was any better to give it. For in medical language, the characters of malignancy, are of a very different nature, and seem rather to owe their origin to weakness, and an increased degree of morbid irritability, and do not bear phlebotomy ; and appear to approach rather to the erysipelatous, than phlegmonous inflammation. Therefore, from a due consideration of it, we would rather denominate it a pestilential remittent,

than by any other modern name ; and if we go to the ancients, Celsus is an authority for this appellation.

That it belonged to the division of remittents, was very evident, for it never continued more than the first three or four days, without a remission ; and then the first paroxysms run into the second, and so on at uncertain intervals. But we believe every one, unless they died within three days, had sensible remissions—in some they had the appearance of the tertian type ; but in others they were of no certain intervals, and the remissions were scarcely discernible. And these last, where the fever continued violent after the third day, with uncertain, or scarce any perceptible remissions, were in common the most dangerous. Whilst the first high degree of fever lasted, though there was great weakness, yet their strength and spirits were not near so far gone, as they were in the remissions, especially if they were well marked ; for then, when the fever was absent in any degree, they were weaker, more dispirited, and cast down, by far, than whilst the fever was high, and the circulation strong and rapid. And this depression, was commonly accompanied with a great anxiety about many affairs, and fear of death. It was best in this situation, to encourage them with hopes of recovery, and good news, and keep all bad accounts of the raging of the disease, and the deaths of their acquaintance concealed from them, until all danger of the disease was over, on their part ; for any alarm was sure to increase the violence of the disease, in the next paroxysm, or even to induce a violent paroxysm, when they seemed to be out of danger. This happened to several of my patients, by being inconsiderately told of the death of some friend, or acquaintance, when in a weak state ; or from being vexed by some occurrence which displeased them. For in some this brought on relapses—exposure to cold, or excesses of any kind, did the same in many when the disease was gone, but before they had recovered their strength.

The before mentioned, were some of the most constant, and invariable symptoms of this disease ; but diseases are as different as human faces ; even those of the same spe-

cies. Yet to an accurate observer, they all differ, in some particulars, from one another, according to age, sex, constitution, and habit of body, and in proportion as they were more or less predisposed to the disease, at the time of receiving the infection. At the first appearance of the disease in August, and September, while the warm weather lasted; the robust, middle aged and plethoric had the worst chance; when at the same time the aged, or young children, and delicate women, generally were safest. But as the weather began to grow cool, and the disease milder, with the strong and robust, and middle aged, it was worse upon the weakly and delicate children, and the aged—and in many very tedious and obstinate; scarce any two were exactly alike, in all their symptoms, and appearances in this disease, those of inflammatory habits suffered the most, and had the worst chance, when the disease was most mortal, before the cool weather set in, about the middle of October; for after that, it assumed a much milder form, and was by far more tractable. We write from observation, and experience, neither favouring nor opposing any theory, or general rule, farther than the cause of truth and science are concerned; and we hope as free from prejudice as most people, and ever have made this a rule, both in the descriptive, and curative part; for the symptoms, and not the names of diseases, are what we have always in the practice of medicine, paid the most particular attention to; and here we cannot but lament the great neglect of the symptoms.

We remarked all through this disease, that it was much milder in the suburbs than in the middle of the city—especially to the southward and westward it was less fatal; and in close alleys, and ill aired streets, it was much more dangerous, and also more general, than where there was a more open exposure, and free air; and the broadest streets were the safest from infection—and when it did happen to be carried to them, from less favourable situations, although the persons taking it to those places, might be very bad, it was not so apt to spread, as in the more crowded parts of the city. This being the case, it is much in favour of wide streets in building, and not looking so

intently towards gain, and crowding so close together; for to the westward there is room enough: and if houses were built more airy, and every one had a garden, where they might enjoy the refreshing exhalations from vegetables, and the pure air which they admit of, it would be both pleasant and healthy in the summer, in comparison of the noxious effluvia from impure air, heated by the reflection from buildings, animal effluvia, and vitiated exhalations, from innumerable sources of putrefaction. This was clearly demonstrated; for even the people from town did not contract the disease in the country, although many of them were there about their sick and dying friends, and their constitutions the same as they had been in town, being only a day or two out when they were exposed to the danger: and it was likewise seen that country constitutions in town, were as liable to contract the disease, as the citizens—many of whom caught the infection in town and died; and therefore there is sufficient reason for supposing, that a deficiency of pure air, was one of the greatest predisponents to the disease, and at the same time the infection being more concentrated, and stronger, on account of the great number seized with it; but at the first breaking out of the disease, this could not have been the case, before we could expect the air to be so much impregnated with the noxious effluvia; and therefore a deficiency of pure air, must have been a principal cause of its spreading at first in town, and the impregnation of putrescent effluvia, otherwise it would have been as infectious in the country, where the sick and dead were, as in town, had not a deficiency of pure air, and noxious effluvia been a predisponent cause, when the first few were taken. For it appeared that it was an infection which required to be well concentrated, to become active, or the air to be strongly impregnated with it, or long applied; but pure country air counteracts it entirely. In this respect it differed from most other species of infection; for the typhus fever, small-pox, measles, &c. are infectious every place equally.

We are convinced that the diseases which soonest destroy, are the soonest cured, when properly treated. We do not mean that they are most certainly cured, or the least



destructive ; but if they are not mortal, the constitution soonest recovers its due strength after them : as it is not so much exhausted by acute, as by chronic diseases, and consequently it will require less time to recruit what it has lost by a sudden, than by a tedious sickness.

In the first appearance of this disease, whilst the hot weather continued, it was either death, or a perfect recovery in a few days ; but afterwards, when the weather became colder, it was often very tedious, though not commonly so dangerous in the first stage ; therefore while the weather remained warm, the great effort between life and death was to be made at once, for many died the third or fourth day : and in cases of this nature, there was no temporizing, to see what turn the disease would take ; for something was to be done immediately—and here accurate attention and experience in the physician, and attendants never was more necessary ; and very often all the assistance which could be given was vain, and every rule of art fruitless, even the most approved—and with the number of calls, and endless scenes of distress and danger, the minds of the physicians were almost distracted, every method failing in many instances ; for then we had none who did actually cure 99 in 100—vain boast !!! Even with all the future improvements which were introduced, although we are convinced they were of considerable importance ; and my success was at least equal to that of any other in the city ; but few who remained in town, were free from distress, by one means or other. Here a particular narrative, &c. might be introduced, and the means by which I lost some useful lives, by their own distrust in my mode of cure.

Whenever called, my first care was to find out whether it was really the raging epidemic, which was the cause of the indisposition, which at least 99 times in 100 was the case ; then by a close examination of the symptoms, and the patient's habit of body, to find what was first to be done. Where the symptoms of inflammation ran high, as they did in one half of my patients, after examining the habit of body, and present symptoms, if they could bear phlebotomy, it was performed immedi-

ately, and repeated it, as the urgency of the symptoms required, in 8, 12, or 24 hours, from once to 4 or 5 times. In this, the hardness and strength of the pulse, the appearance of the countenance, pain and stiffness of the eyes, and across the bottoms of their orbits, the eye-brows, or the optic nerves, and the heat, and other signs of inflammation in the stomach, are the indications for bleeding. This part of the cure we would wish to pay the more attention to, because of being the first who used it in opposition to the mode generally followed at first in this disease; but never used general phlebotomy, nor ever found it necessary. The human constitution is not a mere machine, in which every person, in the same disease, may be treated in the same manner, or by the same medicines; but must be varied according to circumstances.

We should have mentioned vomiting, as the first thing to be done, if it was ever admissible—which after the fever was formed it never was; for then the sick were too apt to be troubled with a spontaneous vomiting, without encouraging it. It was one of the most troublesome symptoms, and most difficult to put a stop to; but at the very first suspicion of having received the infection, or the first sensation of sickness, or uneasiness of the stomach, before head-ache or inflammation began to shew themselves, a vomit in these circumstances might be admissible. I took one myself, and when called in time, gave some to others; and many took them in order to carry off the infection and fever at the same time—which however they seldom accomplished. Many people had commonly proceeded thus far, before they called in a physician; for they were not apt to send, until the fever was formed, and then the time for giving emetics was over; unless it happened when attending some other patients, in the same house with those newly taken, and being told of it in the usual course of visiting—in which case we have several times ordered emetics; but we cannot say that they were attended with any remarkable success, either in alleviating the present, or preventing the future distress. The weight and uneasiness they generally felt in their stomachs, induced many to take emetics of themselves, even after the

fever was formed; but this was always prejudicial. They were, in all cases of this kind, attended with bad consequences; and in many instances the vomiting could not be stopped by any means, though innumerable remedies were tried: for after the contents of the stomach were discharged, whether the vomiting was brought on by nature, or art, a retching continued, bringing up the gastric juice, and mucous defence of the interior coat of the stomach, and whatever drink the patients had just taken. This retching was almost constant in some, and in others returned periodically; and in very bad cases, after the second, third, or fourth day, there was a sediment very much like the grounds of coffee, to be seen in the matter brought up; and in some it was of a livid, or a dark green colour. Very few, if any, lived, who discharged this brown or black matter—they commonly died in a day or two after it began. In others, though a vomiting tormented them, it never assumed this, even in some mortal cases, although no less obstinate and troublesome. The reader may, by this, perceive that there was great attention, and experience, required to allay this troublesome symptom; of course the saline draughts, would be the first remedies that would occur to the mind; but although we tried them fairly with cinnamon water, &c. they were useless, as far as we know; neither were the mineral acids more successful, either diluted or dulcified: indeed every thing of this nature, seemed rather to increase, than to mitigate this symptom. Recourse was then had to fomentations to the pit of the stomach, with much better effect, either by applying bitter herbs of different kinds, or clothes wrung out of a decoction of them with warm brandy, and with good success in several cases of mine; and in obstinate cases, blisters were generally used upon the region of the stomach, sometimes with success. In some cases when accompanied with a burning heat, and an inflammatory diathesis, bleeding immediately carried off these symptoms of pain and vomiting altogether. The most successful inward applications, were soft, mucillagenous and cordial drinks, taken in very small quantities, and often

repeated; for the stomachs of those in this state, could not bear a wine-glass full even of the mildest fluid, at a time—in many cases not a table spoonful; but the best way was to begin with very small quantities, repeated very often, increasing the quantity, if they could bear it, to take off that uneasy sensation; for this purpose, we sometimes used new milk, where it could be procured, or water gruel, with cinnamon or nutmeg, molasses and water, and oil of almonds incorporated, mucilage of gum arabic, or linseed tea, and innumerable other like forms; for almost every nurse had a favourite specific of her own, which were often applied indiscriminately, to all her acquaintance.

The burning heat in the stomach was another symptom, which was sometimes present, independent of vomiting, and very distressing. We never knew any thing so often beneficial in it, as molasses and oil of almonds incorporated, and swallowed in spoonfuls frequently. Molasses by itself, sometimes in those who could not bear the oil with it, or water gruel to those who liked it, or barley water, were all by turns useful, as they happened to agree with the patient.

If the vomiting had not come on, or was restrained after appearing, we always wished to clear the intestines, by evacuations downwards: if there was a vomiting, as was often the case from the beginning, then we ordered injections to be given, and frequently repeated, in order to empty the bowels, and likewise soothe, and allay the perturbation in the first passages. These were often extremely useful through the whole course of the disease, once a day at least; they were composed of molasses and water, with a spoonful or two of oil or vinegar, milk and water, and sometimes a little of the neutral salts were added, if the costiveness was obstinate: manna, coarse sugar, &c. were all useful in their turns. But if the stomach was in a condition to bear purgatives, we never neglected giving the mildest of the neutral salts, with manna, or molasses, cream of tartar, &c. in small quantities at a time, for fear of that dreadful symptom, vomiting. We found none answer better than the rochel salts, dis-



solved with manna or molasses, and a little of it taken every hour or two, until it produced the desired effect. In this practice we had the testimony of some practitioners of eminence before us, and can recommend it from experience. Huxham, whose writings are as good as any of modern date, followed this practice in malignant, pestilential fevers, and wished to prevent the semiputrid contents of the intestines from being absorbed, as the fluids already had an alcalescent tendency; and of course, whatever might be absorbed, would increase that tendency before the intestines were evacuated. This was the more necessary, because the sick were habitually costive in this disease, unless in the advanced periods of it; in some cases, a spontaneous diarrhea came on; it was seldom however a good symptom.

For those whose stomachs could bear common salts, they answered very well. But it was necessary to make them palatable, by adding a little vinegar, or lemon juice, molasses, or sugar; and in this form, they often answered equally well, with any of the other neutral salts, especially if given in small doses, and repeated occasionally. In many cases castor oil was better than any other purgative. This we commonly preferred, where there was much pain, or any great irritation in the lower part of the bowels, which were generally accompanied with flatulent swellings, &c. or costiveness which were very frequent. Here likewise, injections were particularly useful, and when the costiveness continued obstinate, with a tumid abdomen, after the inflammatory stage of the disease was past—purging pills ten grains, calomel two or three grains, or rhubarb and jalap, from five to ten grains of each, with two or three of calomel, answered better than any other. But we never ventured any thing so stimulant as either of these, when there were any inflammatory symptoms present, until they had totally disappeared; and then, or in those in whom there were little or no inflammatory diathesis at first—after clearing the first passages by the neutral salts or oil, as before related, these stimulants often answered well, after the third day, obviating obstructions

in the abdominal viscera, or removing them where present—we generally found it necessary to give one or other of these, at least every second day, whilst the violence of the disease continued; and as soon as they were neglected, the patients grew colic, and the disease increased; but there was much prudence necessary in their use, to adopt them properly to the case, from the direction of a rational medical, and practical induction, as they were by no means to be used indiscriminately, in all cases. But the stimulants, in the low cases, or stages of the disease, as reason would indicate *a priori*; and the cooling neutrals in the violent and inflammatory stages, or cases.—These were the result of the observations which we collected from a great number of patients, and a diligent and very close attention to them, and the symptoms, by the most attentive observation of the effects of the medicines. But many, after the disease was gone, were subject to relapse; or at least to get very much disordered, whenever they became colic, and would immediately get well, by the operation of a purgative. This state commonly remained for a month, or six weeks after the disease, which in my opinion, is a very strong proof of the indispensable utility of purgatives—although we only depended upon them for clearing the intestines, not for a cure, though a necessary part of it.

On the first appearance of the disease, in August we used the antiphlogistic plan of treatment; but soon learned in many cases, it would not succeed without phlebotomy; and as this was rather uncommon, in an autumnal epidemic, and was entirely opposite to the practice, at that time followed by the old practitioners of the city, it required a considerable share of fortitude and of resolution, to set it in practice—but as soon as it was evident that I could not perform my duty to my patients, without it, I resolved to run all risks, as to their approbation. And although the practice was opposed violently at first, the practitioners were all very soon obliged to come into it; and many of them, to carry it much farther than ever I dreamt of, or ever found necessary. In this respect we

could give curious little relations in detail of Dr. R—'s behaviour.

In the early period of the disease, the most proper regimen was accessent drinks, of various kinds—neither, indeed had the sick any appetite for animal food, until their strength began to be exhausted. We never allowed them even broths, or soups, fearing their *alcalescent* tendency; because of the disease having a strong tendency that way. Which we considered was to be prevented by any means in our power; and as there is no vegetable, or *farinaceous* substance which has a stronger accessent disposition than oat-meal, we always recommended gruel made of it. And where my patients would not comply with this—barley water, rice water, sago, &c. some preferred molasses and water—we never saw it used by the sick before, and at first thought it rather uncommon for a drink; but on consideration of its accessent properties, we indulged them in it, and it answered very well. But during the inflammatory stages of the fever, we always enjoined them taking all their drinks warm, and keeping moderately covered with clothes. For a gentle perspiration was a very desirable circumstance, where it could be procured, without stifling the patients, or depriving them of the free and pure air, which was at all times of the disease, a most necessary article. Therefore during the warm weather, we obliged the attendants to open the windows, and when calm to keep them open all night; but commonly in my morning visits, found all shut up close again, and the air of the rooms very noxious, by which alone, there is no doubt, but many have died in the disease, who would otherwise have recovered, by more attention to this particular of pure air, &c.

Whenever there was a remission of the fever, which commonly happened after the third or fourth day, if there was not an inflammatory diathesis present, it was proper to give the bark, either by itself, or combined with *Pulv. Columbo, Serp. Virg.* or in case of costiveness, at the time, with vitriolated tartar, &c. or calomel with rhubarb and jalap, &c. or the *Columbo* or *Serpentaria*, by themselves; and we commonly found that they bore the bark

better, early in the disease, than afterwards; and where they could not bear it in substance, we gave it in decoction or infusion; and where they retained this medicine, it was of the greatest consequence, in preventing the frequent reiterations of the paroxysms, or relapses, when they began to recover—for they were left so weak, and irritable, that relapses were frequent, from very slight causes. Small quantities of the bark was sufficient; from a drachm or two, to half an ounce, in the twenty-four hours. And as there was always a great despondency and weakness present, whenever the fever abated, a little Madeira wine in their drinks, was very useful: and to many indispensably necessary, when all apprehensions from inflammation were over. And this was to be observed, likewise, with respect to the cortex, and bitters; all of which were necessary, in recovering the strength of the debilitated, and exhausted sufferers; but in the inflammatory stages, it was improper. Some were highly prejudiced against the bark, after seeing the bad effects, which followed the indiscriminate use of it, at the first breaking out of the disease. In the early, and inflammatory stages, bark, and wine, being highly extolled, as the grand preventatives of the putrefaction, which was expected to follow, or which they supposed to be inspired with the infection, instantaneously, and by using it very improperly; others were deterred from it, at any time—But this was a circumstance that required circumspection, and experience to determine when it was admissible, and when not. We believe nothing during the course of the disease, required more precision, and discernment to use it with propriety.

However, physicians may inculcate the idea, of amusing their patients with trifles in sickness, there was no time in a disease so rapid and dangerous as this was, to be lost with such amusements; nor to wait for nature to point out what was to be done, and to only observe her motions, and follow them. She was either to be led, or drove, when remiss, as was often the case; and in every period of the disease, an attentive observer would find something very necessary to be done, and at the same time to give



the despondent patients all the encouragement of being past danger, that was possible. For their solicitude on that account, was commonly a great hindrance to their recoveries; and some required to be roused contrary to their inclination to get out of bed, and try to sit, or to walk—which although very weak at first, this was of great importance in their recoveries.

It was remarkable, in this disease, that from the beginning of it, some could get no sleep for several nights, until they had a change for the better, for even when they seemed to sleep, it was restlessness, and not refreshing.—And when their sleep returned, after the third day, it was a good sign, in general; but some, when they did get sleep, were comatose, and lethargic, being as bad on the other extreme. In these cases blisters were of eminent advantage, and the stimulant purgatives before mentioned, as the pulse was in this condition, generally small and low, and the inflammatory period past. But others were comatose and lethargic from the beginning, and this situation portended a fatal event. Here the inflammatory symptoms, in general, ran high, with fullness of the blood-vessels, and blood-letting, and laxatives were necessary; and blistering was very pernicious, by their heightening all the bad symptoms—but Vene Section, and the neutral salts, and particularly injections were highly serviceable; in these the head-aches, were sometimes violent, and in these cases, pediluvia, and warm applications to the feet and legs, such as warm bricks, or bladders full of warm water, sometimes gave relief—Also,

When there was great restlessness, and a dryness of the skin, the warm bath was very useful, where it could conveniently be applied; or pediluvia, or warm fomentations to the feet and legs, were eminently useful, every evening while the head-ache remained.

In some, there was very little remission of the fever, even after the third day; in those where there was no vomiting, and the stomach was tolerably quiet and easy.—The antimonial powder in very small doses, every six or eight hours, with plenty of warm diluent drinks, answered very well, for abating the violence of the fever,

and promoting a perspiration, and keeping the bowels open—and for this intention, they were advantageously combined with proper purgatives, such as the symptoms appeared to indicate, to assist it in promoting a diaphoresis. The neutralized vinegar was a good auxiliary—we commonly used the powder only, in doses of two or three grains, for no larger doses could be given, for in all cases, there was so much irritability of the stomach, that it was too apt to be rejected by vomiting.

The great restlessness in some cases would appear to require opiates, but they never were admissible, from the beginning to the end of the disease; for although they appeared to quiet the symptoms for a little, they soon returned, with aggravated fury; and either extinguished life, or heightened the disease, and always made the costiveness more obstinate; even in the smallest doses, they had bad effects. But camphor, in the low irritable stages, was sometime very useful; we once stopped an obstinate vomiting, with a solution of it in spirits, which, for several days had resisted a number of other medicines. This was in a slender woman, about the 12th day the disease, but it did not appear to answer in the inflammatory stages of the disease; for then the stomach generally rejected it. Being very often solicited to give opiates, to procure sleep and ease the pain, I considered it my duty to continue inflexible to the solicitations, either of the patients, or their friends, representing to them the danger of such remedies, and they were under such apprehensions from the disease, that we believe they seldom disobeyed these orders. When they were weak and exhausted, with the sickness and watching, instead of opiates, we frequently recommended a little good bottled porter, and with many it agreed well, and they were fonder of it than of wine, or any other cordial; the fixed air in it was extremely agreeable to them.

From the method in which some practitioners here began the treatment of this disease, by bark and wine, it must be evident, how many discouragements any person laboured under, who wished to introduce a cool regimen, and to begin with the antiphlogistic plan; more especial-

ly for an unpatronized, and friendless stranger, who had not a great number of years experience—as many people choose their physician as they would their liquor, by the age, and take a grey head for a mark of good sense, and experience; though ever so inferior in penetration. It is true an odd one might live, under the most preposterous treatment: such as the cold bath; bark and wine, and mercurials at first, and such like treatment—and some die under the most judicious plan. But with a person of good sense, the method by which the greatest number, in similar cases and circumstances were saved, must be preferred.

In some of the tedious cases, obstructions of the viscera and swellings of the abdomen, were troublesome symptoms, and very obstinate; we supposed the mesenteric glands to be affected; for although they took food, and drink, they were not nourished by them. This was best cured by calomel, in small doses, often repeated, with some of the stimulant purgatives; these were very tedious of recovery to their former state of health.

In several there were abscesses formed in the lower extremities, some of which were very dangerous and tedious, and difficult of cure. We always encouraged their suppuration by poultices and fomentations, and discharged the matter by incision, supposing them to be critical, and that discharging of them, might be attended with bad consequences; in every one of my patients, who had them, we could trace them to getting cold, in the first, or inflammatory stage of the fever, as many were very careless in this particular: tossing the bed-clothes off, and restless, fretful, &c. which always added to their danger, and was a very bad omen, wherever it occurred.

Small pimples about the mouth, were a good symptom, or eruptions of any species; not that the small discharge could be of any consequence, but they were an indication that the vital strength was not exhausted. Some, and especially children, bled at their mouths, in small quantities, and of a thin substance; the blood blackening their teeth, and lips. But although we often examined narrowly into their mouths, we never could discover where

it came from, most of those lived, who had this hæmorrhage.

In October, and the latter part of September, we could always observe the effects of a few days of cold, or windy weather, those who were ill before, generally got better by it, and others were not so apt to be taken; this gave me the first hopes, that the disease would disappear in winter. It was likewise, a strong recommendation of cold, and free air, in the time of the disease, after the inflammatory stage was over to breathe fresh and cold air, keeping covered with the bed-clothes at the same time; but coldness also had its limits.

It may now be proper to take a retrospective view of this dreadful disease, and consider its nature: at its first appearance among us, and even long after, we thought it might have been generated here, by the heat of the summer; and the great number of persons who were in the city; but upon more mature reflection, there are many reasons against that opinion—for we may easily perceive, that along with the symptoms of the bilious remittents of warm climates, there were a complication of typhous appearances; and also the most virulent infection, often very obstinate and intractable. In some it resembled an ardent bilious fever; and in others it was more like a remittent, and as the weather became colder, it had much of a typhous appearance. So that upon the whole, we suspect there was imported infection. For the genuine typhous fever, is a very different disease, both in its nature, and origin from this. Remittent fevers, whether bilious, or not, never are so very destructive as this was; unless where infection is either generated or imported; and seamen, from their modes of living, confinement, and want of air, especially in ships of war, where the men have scarce room to sleep; we would suppose are sources, either for the generation, or for propagating infectious fevers.

Soon after the settling of Barbadoes, it appeared there, but it scarcely ever appeared in times of peace, and it has often been forgotten between one war, and another; and we have no doubt but it might be carried to those



parts of Europe where their summers are warm enough to predispose men to it.

But as these causes do not produce the disease, we would be led to suppose, that it is not a spontaneous production of the climate, but of a foreign, and probably a pestilential origin; for it appears to have many of the symptoms of the plague, for its inseparable attendants, particularly the burning pain, heat, and inflammation of the stomach, for these we never saw absent in any case; and however proper it might be, while the fever raged, not to give a disease so dreadful its real name; yet we believe a pestilential fever is the most proper epithet for it—very uncommon diseases rarely ever appear without infection; for the diseases of the seasons, the climate, or local situations recur so often that they never cause any extraordinary alarm, but return periodically, and spread gradually; and even where infection is generated, it is not produced instantaneously, but becomes so by degrees, by the effluvia from persons in the same disease being concentrated, and acting on persons predisposed; but we had no fever here before the late infectious one appeared, and from its first beginning it exhibited something extraordinary in the mortality and rapidity of its progress.

Towards the latter end of October, and November, it was neither so dangerous, nor so rapid in its progress; for in some it continued then to the 21st, and in many to the 14th, or 17th day—but in August and September, if the sick past the seventh, or at farthest the ninth day, they might be pronounced out of danger, and they commonly recovered soon, its termination being so rapid, either to health, or death, that the patients were not much exhausted. One of my patients a Mr. Kay, a young man from England, who had exposed himself much to the infection, was only six hours sick with it; my own case continued two nights, with very little uneasiness on the intermediate day; so that I visited my patients as usual, although my fever was extremely violent in the night, being taken about noon it increased gradually, with a heat and uneasiness at my stomach, and a head-ache, until about nine o'clock; I took an emetic, and before going to bed an

antimonial powder, and some warm gruel, hoping that this would put me into a perspiration, and went to bed, but could not sleep; and before twelve the burning heat in my stomach and thirst was so great, that it was totally insupportable; not foreseeing this, and wanting drink, I got up and felt my strength not in the least diminished, and wishing not to alarm the house, got some cold water—but in a few minutes the same sensation returned, with increased violence; it was now plain that cold drink would not answer, and some warm gruel was soon prepared, of which drinking about half a pint, it vomited me immediately; without any nausea or effort on my part, the burning thirst still continuing the same—then I began to take only about a wine glass full at a time, and in these quantities, it seldom vomited me; and I took also some Rochel salts, with syrup of buckthorn, in small quantities, and also a grain or two of antimonial powder; and towards day the purgatives operated, from which the fever went off gradually, and I got some sleep, and next day was much better; I then took blood of myself, until I fainted, and walked about the most part of the day; but the next night the fever returned as violently as the first, and the same mode of treatment was pursued, and the next day it went off as before, but left a melancholy state of mind after it, but did not return with the same violence any more, but the distress which was about me, was probably the cause of a melancholy, which remained about me for a week after. At this time no consideration would have detained me in Philadelphia, if I could have got away, but the stages being all stopped, and not knowing where to go; at that time I considered the place as my tomb; but set about attending my patients again, and the exercise and new objects alleviated my mind; and soon wore off the despondency which hung about me. It is rather wonderful that the person who tied up my arm, and assisted me in taking blood, being taken with the fever himself the same day, would not suffer himself to be bled, so prejudiced was he in the popular opinions, at that time so prevalent; but being myself sick at the time, he appeared to suppose me delirious, and would have farther

advice ; by which means time was lost, and nothing decisive done at last. For he required bleeding, to at least five times the proportion that I did : but having been unfortunately told, a day or two before, by a physician whose opinions he valued highly, that wine and bark were the grand specifics, both for prevention and cure, he used them as long as he was able.

The yellow colour is probably caused in this disease, by an inflammation of that part of the intestine where the biliary duct enters it, by a slanting course, which may obstruct it as a valve ; a jaundice is sometimes caused by this, and similar means—the irritation of worms also causes a jaundice often.

The irritation and inflammation of the stomach, appears to cause the spontaneous vomiting ; but although a mucus or serous substance is secreted by the villous coat of the stomach, when inflamed ; yet we believe the matter of the black vomiting is always from the liver, the crassamentum of the blood, being admitted into the biliary pores, from whence it is conveyed to the stomach by the vomiting.—In Dr. Wistar's history of his own case, he remarked the spontaneous vomiting being produced without any nausea, or effort. He also made some interesting remarks on the effects of the medicines, and regimen, but particularly on the effects of cold air in the advanced stages of the disease. The perusal of this case, afforded me some pleasure in those times of confusion, and distress : and we believe it has not been hitherto exceeded, for accuracy of description, &c.

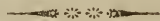
It is a truth which has been long known, that a physician who is well acquainted with medical philosophy, may not only thereby be prepared to obviate every unusual symptom, which may happen in any common disease ; but he is also capable thereby, of encountering any new disease, although he had never heard of its name before. We believe that no person, who knows the extent of medical science, will doubt this.

To many it may appear extraordinary in me, to adopt a practice which was known to be diametrically opposite to that of the times. My situation was certainly critical—

the general attention was soon turned to any new mode of practice, and the opposition it met with at first, is well remembered by many ; but as my former employment had turned my attention to judge for myself in all cases ; consultations being there often impracticable, and here, at that time, it was soon discovered, that opportunities were often lost by the delay they necessarily required. In this situation, considering my right to use my own senses, as well as formerly ; and the result of my experience and judgment, to save the lives of my patients, and not servilely follow names, or bodies of men ; so that with not a friend or acquaintance of six months duration in the place, it is very evident, that nothing but a firm persuasion of the rectitude of my conduct, could have supported me, together with a firm persuasion that those principles of medical science, which had often before carried myself and others, through various dangerous situations, would not deceive me at that awfully distressing period, when sickness, death, and desolation, were spreading all around me. This was certainly a time to rouse every latent power of the mind ; my principles and practices, were communicated without reserve, to all those who conversed with me, as some of them will yet bear witness to ; particularly Mr. Robert Patterson, professor of mathematics, Mr. Robert Underwood, of the treasury office of the United States, and Dr. S. McCulloh ; these gentlemen knew of my practising, and recommending the modes of treatment, which were soon after received as a new improvement, for some time before any other in the city. They are also partly acquainted with the opposition which they met on their first introduction, and the rationale on which they were founded ; and also the cause of the quick transition which took place after the fifth of September. Before this there was no competitor for any of my modes of treatment ; but very soon after there were many ; for in a few days, my most violent opponent made no scruple, not only of adopting so much of it, as he had learned by an accidental interference and its consequence, but also of publishing it as a discovery of his own, but carefully concealing the real circumstances of the case. (See Brown's newspaper for September



1793, and the following statement of facts.) But it is a peculiar happiness that myself and my opponent are yet as sane both mentally and physically, as at that time ; he has therefore a fair opportunity of making the proper reparation, or apologizing for, or explaining such unprecedented conduct as he exhibited in this dark proceeding ; for he may still expect one in me, as ready to meet him as formerly ; in the defence of truth, in any department of physical or medical science or practice. More rude means we shall leave to those whose professions require such modes of decision ; and that his dignity may not be supposed to suffer on the occasion, he is requested to recollect, that one who taught him a useful lesson, has a right to expect some concessions.



*A statement of the author's claim to the discovery of the improved method of treatment in the Pestilential Fever Philadelphia, in the autumn of 1793, in opposition to the pretensions of Dr. R——, and others.*



Medicina res publica est, non autem monarchia, multo minus tyrannus.

Baglivi, op. p. 744.

**T**O be under the necessity of commemorating injuries is extremely disagreeable, especially those which we have personally borne. Considerations of this nature have prevented the present subject from being laid before the public these many years past. But as it is a regulation in civil society, that when one person in any line of life endeavours in a flagrant manner, to injure another, it is

naturally expected, that there should be some means of redress; which if the aggressor is not impelled by sentiments of morality, or candor to perform himself, there are in some circumstances, means to oblige him to it; but as this is not always the case, we may often have no other resource, than the judgment of the public. When after a series of years, so far from having had any reparation made, we have but too much reason to conclude, that the same principles, which actuated the first breach, are still in operation, but in a more insidious and guarded manner. It is high time at the end of eight years, to lay a transaction open to the public, which has been so cautiously concealed from it.

September 4th, 1793, about seven o'clock in the afternoon, Mr. Hugh Ross came for the author to visit his wife and son, whom he said had been both taken with the fever that day; his wife had been taken about 12 o'clock, and his son between five and six, or only an hour before this visit. This woman being of a masculine constitution, and her pulse and countenance indicating an inflammatory disposition, bleeding was proposed as the first part of the treatment, which after some hesitation, on account of the general disapprobation of this practice, at that time, was at length reluctantly consented to. The son's fever not having yet raised high, he was not bled; but both of them had gentle laxatives, &c. But having called a second time, at ten o'clock the same evening, the author was told that Dr. B. R— had been there a little before, and also that he considered Mrs. Ross as his patient, having been called to her soon after her being taken sick. It was also mentioned that he had made a very great noise, and condemned bleeding as a murderous practice in that disease, and used several rather virulent and bombastic expressions, which immediately made a considerable noise about the neighbourhood. When these proceedings were mentioned to the author, he replied, that as to what Dr. R— said or thought of his practice, he could not answer, as it was well known, it was not of him he had learned his practice, neither had he any reason to follow his example; but that he would take the first opportunity of waiting on

the Dr. for an explanation of these proceedings ; and next morning about seven o'clock, he called at Dr. R—'s house, and met him at his own door, accosted and told him his name, and the occasion of his calling, as this had been the first time he had called with him. On this occasion, Dr. R— appeared to be much agitated with the passions ; which, as it was altogether a medical interview, we shall only mention the predominant symptoms—these were a pale face, a trembling of the lips, and faltering speech—Ominous phenomena it must be confessed, and so we found them. When the author assured Dr. R— of his not knowing when called to Mrs. Ross, that she was under the care of any other physician, he behaved in a manner very different from what we would expect in a physician or philosopher ; his words were unqualified, and rather virulent—such as we must sometimes have heard from persons, who bore very different characters. On which the author remarked to him, that had he not entertained a better opinion of his liberality, from a book of his which he had read, he would not have taken the trouble of calling with him. But as for the practice which he followed, he mentioned that a few days would determine its merits ; for with him it was no random proceeding, but the result of mature deliberation in the present disease—having followed it on the recommendation of, and with the approbation of the examining physicians in his former practice, in the employ of the E. India company : (Dr. Hoffack had particularly recommended it, and Dr. Lorrimer had approved of it, in young, strong persons, in all their diseases, where there were any appearances of inflammation present,) and in the present disease, he was not afraid of defending it before the highest authority. About this time Dr. R— getting a little more calm, assured the author that this affair was certainly prosecutable : to which the author replied, that as medicine had been his study, he was not certain what the laws of the place were in that respect, although he knew of no justice, which would condemn his using all his endeavors to save life, when requested.

After much altercation, Dr. R—'s paroxysm being almost over, it was mutually agreed, by his own proposal, that the author was to have the care of the son, as he had first seen him, when taken sick; but that he was to have the mother for his patient, as he had first seen her, and not to interfere with one another, in their respective modes of treatment; this the author considered as an amicable settlement, and so ended the interview.—This was September 5th, between seven and eight in the morning; and that day and the next, each attended their own respective patients. Here the author expected candor, which he practised so strictly, as never more to enter Mrs. Ross's room, although solicited every time he called to visit the son: but the third day, September 7th, he found that Dr. R— had not behaved with the same candor towards him. But the means by which he took this patient from under the author's care, are best known to himself; for no witnesses remain of that house—We learned that he tasted the medicine, and spit it out with a significant air, and condemned it. It is very plain, the author might have taken the mother from under his care, by his being called in after him. Some other of the circumstances of this proceeding, which afford much room for reflection, we shall not mention on this occasion. The former behaviour might have happened through passion, but this had the appearance of something very different.

The author's small circle of acquaintance, and himself, thought that this would have been a fair trial of their different modes of practice; and a certain old acquaintance of Dr. R—, gave the author some characteristic hints, on the occasion, as he was a stranger. As soon as the nurse related the particulars of this interference, the author could not avoid considering himself as very ill treated by both parties in this proceeding, and left the house with a promise of never returning to the same people; by which means Dr. R— had the exclusive treatment of them all his own way.

We learned afterwards that the mother and son died between the seventh and ninth day. Ross himself, and



the nurse soon afterwards. It is probable, that the reason of the author's being called to this family, was his having just before brought Mrs. Millon, their next neighbour safe through the same fever.

The change which took place in Dr. R—'s conduct, and practice about this time, is yet very well remembered by many of the inhabitants of Philadelphia. Before this time he did not bleed in this disease; but the extent to which he carried it afterwards, is well remembered, and also the means by which he became acquainted with it—For which see Brown's newspaper, for those times, particularly a letter to a Dr. Rodgers, of New York, in which he says "that by the tenth of September, he found it necessary to begin to bleed." We believe he began it about the seventh, when mention was also made of his having found out the right method of treating the fever, and boasting that he would now cure 99 in the 100. But the author disavows his ever giving him any such sanguine hopes as this, or ever inculcating general phlebotomy, or the indiscriminate use of calomel, for this he denounces most sincerely. But it is remarkable that a practice which Dr. R— had so lately condemned with such virulence in another, he now got so good an opinion of, as to father for his own, and could even quote some authors in its favor; particularly Dr. Mosely, whom the author had mentioned as an authority for his practice; and so he might many others, after he had been assured of its advantages in the existing disease, for without this, it is probable the books might have been as dumb as before, when under the dust of the shelves, all the preceding time of the disease.

The next time which Dr. R—, and the author met, was in the beginning of the next winter, at N<sup>o</sup>. 40, Chestnut street, where mention being made of the former interference—the author requested Dr. R—, to do him justice in that affair, as he knew that he was then writing an account of the fever; this he expected that he would have been generous enough to have mentioned, as it occurred. But it is an old remark, that some persons can never forgive those they have injured; this was probably never more fully exemplified than in this instance. But over

the whole of this dark proceeding there is a mysterious veil drawn. Had he mentioned this fact in any of his publications, as it occurred, it probably never should have appeared here. For although the author was often solicited, soon after that fever was over, to publish the whole of this transaction; it being considered by all those, who were acquainted with the circumstances of it, as being of some importance, with respect to the cause of truth, and justice, as well as to himself, but it might probably have still remained in silence, had it not been mentioned sometimes of late, that there were reasons for this delay. Dr. R—'s, seniority is the only reason which the author acknowledges, and on that account, he has given him sufficient time to relate this affair. Among some classes of men, we could only expect such behaviour as this. In the liberal profession of medicine, we have generally found better; and we still hope, that liberality is not totally banished from the inhabitants of our globe. As to the facts stated here, there are still living, some respectable inhabitants of Philadelphia, who gave the author leave to use their names, in confirmation of them. We yet hope that they, and many others who are acquainted with these circumstances, will still retain so much of the genuine sentiments of candour, as to vindicate the cause of truth, and justice, and this is requested of them; and as it is known to be an inherent principle in all generous minds, the author entertains no doubt, but they will comply with it, even at this late day.

When the French physicians got into practice, some of them, who had seen practice before, used a method of treatment, not much different from that followed by the author; only that some of them placed more dependance on acids than he did. But at the time he begun it, he did not know of one French physician in town, nor for a considerable time afterwards, at least not until after this interference; soon after which, it was heard of, by all the medical men in town—being in a day or two mentioned at a meeting of the College of Physicians, which body Dr. R—, has never since attended with his old associates. And even refuses consulting with those, who take the liberty of thinking for themselves, especially if they should

be so unfortunate as to differ from him. It is well known that a physician, who cannot think, or act for himself, is a meer cypher, and a man who cannot bear either competitors, or equals, is a very bad republican; for the politics of a Robespierre, or the religion of a Cromwell, can only deceive the thoughtless. Such behaviour does not well agree, with the prefixed sentiment of the justly celebrated Baglivi, who although physician to the Pope, knew what belonged to the liberality of his profession.—But what are we to say of Dr. R—'s threatened prosecution?

We have since learned that every person in a dangerous situation, is at liberty to change their physicians at any time, and few old ones, on being told of a younger being called in their absence, would be very solicitous about regaining them. But as justice cannot hang all on one side, we believe Dr. R—, laid himself open to law here. Had the authors improvements, at this time, proved abortive, his fate may be very readily conceived; but as they overcame all opposition, in a very short time, it was both unfair, and ungenerous, to endeavour to rob him of the merit of their introduction. With respect to this affair, it is hoped that names will not so far pervert men's judgments, as to give them an undue bias. It may be also premised, that it will be considered both as unjust, and ungenerous, if any others interfere in this matter, but the parties who were personally concerned. Therefore, intruding volunteers, may expect their deserts; for we know of no good principle, which would justify uncandid proceedings, even in small affairs. However the introduction of a mode of practice, which it is highly probable, has since saved the lives of some hundreds, or even of thousands, was an object of some importance. Neither should these improvements have been unpublished at that time, had not Mr. Brown, to whom the author handed a paper at that time, neglected inserting it, because it did not come recommended by a popular name. Neither do we consider religious ejaculations, which when pressed into foreign services, are unfortunately too often prostituted to hypocritical purposes, or the reiterated professions

of Pseudo philanthropy, or morality, or the ostentatious display of borrowed hypothesis, and ideal superiority, or the perversion of reason, and the experience of ages at all necessary in order to establish his principles. Yet he does not aspire to the honour of a persecution, like Socrates by the Sophists, or Galileo, by the ignorance, the prejudice, and bigotry of his times, for the sake of *truth*.





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AN

*Historical Introduction*

TO

PHYSIANTHROPY,

OR, THE EXPERIMENTAL PHILOSOPHY  
OF HUMAN LIFE,

THAT OF DISEASES, AND ALSO OF REMEDIES.

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Desideratur nimirum, Philosophia Naturalis, vera et activa,  
cui Medicine Scientia inædificantur.

*Bacon de Augment. Scientia. Lib. IV. Cap. II.*

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OF all the physical investigations, which have at various times employed the human mind, there are certainly none of greater importance, than the subject of the present investigation: but although it is peculiarly interesting to the physician, it is also eminently so to all mankind, for an acquaintance with the physical nature of human life and health; and their various states and affections, &c. are obviously of much greater moment, than any other natural subjects. For hereby it is obvious, men may learn to guard against diseases, although it does not follow as a necessary consequence, that every one should arrive at such perfection in this science, as to become adepts in the art of healing; although we believe it is sometimes practised without this most necessary part of science.

There is in all living animals, a principle, the effects of which are obvious to all men, during the presence of which there is life, but in its absence death, this we may nominate vitality. It is a principle, infused by the Supreme Being, through all living creatures, under various modifications, which in the animal creation, is as universal as gravitation in the universe. And although they may be both equally obscure, in their causes and modes of operation, yet we may observe, experience, and reason on their effects; and collect the result under different heads, classes, or species, and the information which we acquire hereby, may very properly be called the philosophy of the human body; and of its diseases, when we confine ourselves to it. But when we take into the account, other substances or causes, which affect the human body; it might be called medical philosophy. But as life cannot exist in any animal after birth, without the accession of external substances to the body, therefore, we cannot consider human life, as at any time independent of them, and by itself; as that is a state which never occurs. And therefore we can have no experimental knowledge of it, unless in the embryo; and in that state they act on the mother. But amidst the variety of substances, which continually surround us, we are to make animal life, as it operates in the human body, in health and in diseases, the primary and great object of our attention. But as the intercourse between the mind and body, is so obvious and constant, it will be necessary, on some occasions also, to pay particular attention to the mind.

Some of the most general and obvious properties of vitality, are sensibility and irritability, these were formerly supposed to be one and the same property, and were always confounded so, until Haller endeavored to prove that they were different, and resided in different parts of the composition of the body, but although it is certain that many parts are irritable, which are not sensible, yet we are not sure that all sense is not caused by irritations, as that is not easily demonstrated, for it is probable that sensibility is caused by more forcible, or stronger varieties of irritations, on parts properly organized for the purpose,

this is very probable, and there are good reasons for it, as will be shewn in its proper place, and sympathies, or consent of parts, are only secondary irritations, propagated from one part to another, as the part primarily affected is said to be irritated, but when that irritation is communicated to another part, this is caused by sympathy or consent, but association, we would wish to confine to the mind as formerly.

The vital principle, like many others in nature, we have sufficient reason to believe, may be present in a latent state, and lye dormant for some time, and afterwards shew itself, when acted on by stimuli, as in fainting, catalepsy, &c. in human subjects, and in these animals, which exist in a torpid state in the winter, as snakes, alligators, frogs, &c. the stimulus of heat is only wanted, to rouse the vital principle, to energetic actions for life: or its principles, must be present, or they could not recover merely upon the application of heat. And in catalepsy or fainting, by irritating parts which are susceptible, as the nose, or the stomach, it being easily affected by an emetic, a practice which medical philosophy directed us to, the first time that we knew of it succeeding in this disease, and irritating the nerves of the nose, by snuff, volatile alkali, eau de luce &c. or the palate and stomach, by something strongly stimulant, &c. are very useful in recovering persons from fainting, or hysterick affections; all these shew evidently, the power of stimulants, on the vital functions of animals, under which we include, what were formerly called, natural and animal, as the division and the terms are of scholastic origin, the defects of which have been often remarked. Many parts in which the vital principle exists, are not sensible, through want of a more compleat, or appropriate organization, which their uses do not require. But sensation requires organization, or a peculiar intertexture, of the blood vessels, and nervous medulla, principally this last, which is the residence of sensibility, as experiments have often demonstrated of late: although the coats of the large nerves are said, by Haller and others, to be destitute of sensation, and the whole trunks of the nerves, according to Robinson, on the animal economy,



and also many other parts when in a healthy state. But when any of these parts are diseased, they are endowed with a very acute sensibility, as experience teaches. This appears to be caused by increased, or new actions of the diseased parts. Diseases often increase the sensibility, as we may observe, where there is much irritation, as in wounds, ulcers, &c.

As the vital principle is constantly flowing into all parts when in a healthy state, if the parts are used in the exercise of their functions; by moderately expending their vital energy, both the inherent strength, and the vital energy, are thereby increased: as we may daily observe, in the exercise of any limb, or organ, of young, or middle aged people, and in the heart, intestines, or stomach.

We must allow of a state of inherent strength in animal bodies; as it can easily be proved that the fibres and membranes of full grown animals, are much stronger than they are in childhood or infancy. This is what we are to understand by inherent strength, or *vis insita*, in opposition to weakness; but the vital energy is a different property, and it is more unsteady—always accumulating, and as constantly exhausting, and not long in the same proportion, in any part. As air, aliment, or exercise may be regulated, and the habit of the patient may be tempered originally; for the same food does not always produce the same stature, strength or vital energy; nor does the same education often produce the same information.

In childhood, we can easily prove, that the solids, and even the bones, are soft and flexible, and that they grow stronger and firmer, as we advance in years, until we arrive at our acme, or height of bodily perfection; and after that they become over rigid, and the influx of the vital principle, which is most abundant in youth, particularly in infancy, becomes gradually less as we pass our acme, until in old age it becomes very deficient; but varies at all periods, according to the state of bodily health, ease of mind, &c.

The female sex, are commonly originally weaker than the male, and less in stature; and their modes of life in

civilized countries, commonly increaseth their delicacy, more than it does that of the males.

To understand the human body, and the laws by which it is governed, and its diseases, &c. we must consider it under every circumstance, and in every point of view in which it may be placed, either from internal, or external affections, and take all our facts from nature, and exclude opinion where ill founded, and only admit of observation, experience and reason. This plan will lead us to admit every thing, which is really true in fact, but nothing imaginary. On this account, we would not assert that all animal life, and its phenomena, depends on the irritability of organized parts, although it is certainly a very general property of the vital principle, as vital strength, and perhaps other unknown properties, may belong to vitality, with which we are yet unacquainted. As electricity and magnetism were many thousand years unknown to mankind, so was irritability itself; and others may yet be discovered.

We may observe any part of the works of nature, without paying attention to them, or without ever learning how causes produce their effects, or any other of its laws or phenomena, and great wonders, or even miracles are daily happening before us; but because they are common, we pay little or no attention to them. But when an enquirer wishes to investigate these matters a little farther than external appearances would lead him, he is under the necessity of adding experiment to observation; and sometimes must put nature out of her usual routine: and in the same manner may we become acquainted with the philosophy of the human body, as well as with any other subject in nature; for the doctrine of life and health, cannot be well known by reasoning *a priori*; but it often may, from sickness, its opposite, and from wounds, morbid dissections, and medical experience. Therefore it is rather over-shooting the mark, to admit so many divisions of the theory of life and disease, &c. as has hitherto been done, ever since Galen's time. The laws and principles therefore, should be divided in a different manner from that of the scholastic, &c. The human blood ap-

appears to be recipient, and the vehicle of heat and life, to the different parts; and by some late experiments it would appear, that the pure principle of the air, is the pabulum of irritability,—for being deprived of pure air, destroys life sooner, than the defect of any other natural substance, although the inspiration of fixed air, or a large quantity of electric fluid, kills instantaneously, by extinguishing the vital principle, but here we may observe, that the extraction of irritability, is most probably the cause of all these phenomena which follow. Besides, the blood being the vehicle of heat, and oxygene, it does other offices in support of vitality, &c. by the irritation of distention in the heart, the smaller blood vessels, and the glands, to which it also furnishes fluids, for the different secretions, and likewise for nutrition, so that it is necessary to every vital part of animals. The fluid next in importance to the animal economy, or perhaps the first, is the nervous fluid, or the medulla of the brain, and spinal marrow, for they are all of the same nature, and origin, secreted in the critical part of the brain, as appears by reason, and experience, for this fluid is a glutinous, or mucous substance; is easily seen and demonstrated at its ingress into the nerves, and at every part of them, which is large enough for the demonstration, and is diffused over every sensible, and irritable part of the bodies of animals, and preserves their moisture, and is the vehicle of sensation to the sensorium, or mind, and probably directs all its actions.

As the plan we mean to pursue, is in some respects new, it may be necessary, in order to give determinate ideas of our terms to define the sense in which we use them, although they are not new.

The term of elements, appears to be going out of use at present, because, of some modern improvements in our modes of investigation. Many substances formerly supposed to be elementary, may now be separated into their component parts, each of which claim the title of elements; so that the former elements are now found to be compounds, and by a similar mode of reasoning, so may these last, by future analysis, &c. But as the term, when

defined, still has its uses and applications—we understand by elements, the most simple component parts of bodies, which are, or can be made the objects of our senses, primarily, and by themselves. And principles, we understand to be those component parts of substances, which are not, or cannot be made, the immediate objects of our senses, and are only known by their effects; they may be said to be secondary elements, and in this view of the terms, our solids, and fluids may be reduced to their chymical elements, and instead of earth, water, oil, &c. we may have azote, hydrogen, carbone, &c. And we have examples of principles, in the vital energy, irritability, sensibility, elasticity, and innate, or inherent strength, the contested (*vis insita*.) These are merely nominal, expressing only the names of things—but there are also verbal expressions, to signify their modes, or manners of acting, and their laws, derived from their modes of being, or acting. Properties, or habitudes, we understand to be modes of action, whether of natural substances, or their component parts, elements, or principles, so long as we are uncertain of their modes of action, to reduce them to general laws. Laws are in part explained by the preceding definition; they are those fixed, unalterable, and well known modes of action, or properties, which are certain, sensible and permanent; and not liable to change: so that properties, when well known and established, and their modes, and circumstances of action, recur invariably under the same known circumstances, may be considered as laws.

In whatever light we view medical science, we shall find the physical nature of man obtrude itself into our view, as the connecting medium of all rational investigation. It is, we may assert, the spirit of all medical philosophy, without which all others are of little value. It is by the application of this science, that we investigate the nature of health, from the effects of diseases, and the operations of remedies from both; but it is more frequently applicable, in tracing the nature of diseases, and of health, from the most effectual remedies used in their cures, for we can seldom reason justly *a priori*. In these subjects, there-



fore, we must in many cases, have recourse to our experience in the treatment of diseases. As an apology for the introduction of a new term into the profession, we may observe, that no other could so well express our meaning. Its derivation (from *physis*, nature, and *Anthrops*, man,) will readily be perceived, to be from that language, in which medicine was first taught in a rational manner; and from which of consequence, most of our terms are derived.

Physiology in its general meaning, is a term too extensive, comprehending all the subjects of nature; but in its medical acceptation, it is too much confined, being only applied to the healthy functions of life. And in all medical language, we cannot find any word to express the healthy, the morbid, and curative nature of the vital actions, this alone excepted; for the animal economy does not express it; neither does animal physics—and we consider it much better to introduce a new term, than to change, or misapply old ones. Long before we adopted this term, we used physiology in a sane, morbid, and curative meaning, when reasoning on the nature of life, &c. As for the terms of pathology, to express the diseased state, together with the subdivisions of it into semeiology, for the doctrine of the symptoms, and of nosology for the names, and division of diseases—we have no objections to them, if they are kept within their proper limits; neither have we to therapeutics, for the curative indications. But we confess, that we believe these terms are used too much in the antiquated, scholastic manner, to be applicable to investigation in the present times.

The reasons of our objections to them are founded on this consideration, because they have been commonly considered too much as separate subjects of pursuit, unconnected and independant of one another; whereas, in reality they all depend on physiology, as much as this does on anatomy. For without an accurate acquaintance with physiology, there is not one principle, or mode of action can be either learned, or understood, of all that belongs to the human body, in a diseased state, any more

than they can in a state of health. For instance, suppose we were to attempt to investigate any one principle, or law of human life; we cannot reason on these subjects, *a priori*, any more than we can on any other subject of natural philosophy. We must therefore, have recourse, either to observations, or experiments, for the operations of nature are best learned, when she is put out of her uniform course; and when it is in this state, they cannot with any propriety, be named the healthy actions, although they are still the physical operations, a little deranged; and a more comprehensive term is obviously requisite to express them by. Suppose we were to take that most extensively useful, although perhaps least understood of all the principles of human life—irritability. It is very evident, that we will understand very little of it, by considering the healthy actions alone; but by tracing it through all its varieties of actions, in a sane and morbid state, by observing its properties, and from them collecting its more invariable modes, which may be distinguished by the appellation of laws; we experimentally acquire a sensible, and intellectual knowledge of this principle. In the same manner, we must trace sensibility, vital energy, and inherent strength, or any other of our vital principles, or properties. The importance of these pursuits may be demonstrated thus: Turn to which branch of medical philosophy we will, we shall always find the subject of physianthropy necessary in the pursuit; the operations of medicines are to be learned from this alone; for however uncommon the idea may be, it may be found in Hoffman's large work, that medicines contain no inherent principles of action in themselves. They do not act on the dead body; says Hippocrates; and their actions on the living body, depends on the state in which they find it, whether torpid, or irritable, strong, or weak, &c. It is the same with all the parts of regimen, as food, and drink, air or exercise, &c.

When we wish to consider the nature of any affection of the human body, whether of a specific disease, or symptom, or their causes, or modes of action; we must immediately have recourse to the physical actions of the body,

in order, even to form ideas of them ; and unless we have some object to direct our pursuits, such as may serve to collect the dispersed rays of information to a point, from which they may be again dispersed, and mutually applied ; to collect a multitude of facts, unless so directed, must cause confusion.

The collection and preparation of medicinal substances, whether animal, vegetable, or mineral, is altogether independant of this science ; and so is it also of them, only when they are applied to the body ; they explain some of the vital actions of vegetables, but not a general and particular knowledge, of the physical nature of life, and its different states, or temperaments, &c. and the nature, and varieties of diseases. It is certainly very necessary for a physician, to be able to know, and to distinguish medicinal substances ; and also to be capable of preparing them occasionally ; but one may have all the knowledge, that ever was acquired of their chymical properties, as some apothecaries have, without being in any measure acquainted with their physical operations on the human body.— Here then, are separate pursuits, and the boundaries are distinctly limited, between the auxiliary, and the immediately necessary, and universally applicable parts of medical science.

When we enter into the investigation of the causes of diseases, although a knowledge of the external agents are necessary, yet we shall find the internal state of the body, by far the most important consideration ; for besides that, the greatest part of diseases are to be traced to the different states of human bodies ; even those which are from without, are very much modified by the states in which those persons are, in whom the morbid actions are produced. Besides there are many persons of such peculiarities of habits, as to escape every disease, however general, or violent : unless old age, and surgical diseases, or accidents. The proper manner of distinguishing diseases, by their phenomena, or symptoms, and that of arranging them according to their genera, species and varieties, is only to be accomplished by attending to their general and

particular natures and causes, and even in some instances by their methods of cure, &c.

It is our wish, when on this subject, to collect all the sensible, and rational information, which we can procure from observations, and experiments; but at the same time, to exclude all merely speculative opinions, because they cannot possibly lead us to any useful discoveries, but may carry us unawares, into pernicious practices; but the great difficulty here, lies in drawing the line of separation, between these different modes of pursuit.

As an instance of one of the most notorious pieces of speculation, which has appeared of late years, or that probably ever did, in the annals of medicine; we may mention the well known Brunonian hypothesis, and all the adherents to that romantic production, must inevitably come under the same denomination. By substituting new terms, for well known ones, and endeavoring to reduce all the natural functions of the human body, to one property, it carries with it an air of novelty, and ingenuity. Asclepiades vainly boasted, of reducing the study of medicine, to a course of six months; but this would reduce it to less than as many weeks; so that it must be peculiarly agreeable to students; for here are no laborious investigations of facts. But like the Ancient Grecians, in their physics, who found it easier to form worlds in imagination, than to investigate, or analyze the smallest part of that in which they lived. But we hope there are very few who have any experimental, and rational knowledge of human physics, who will not readily perceive the futility of such whimsical pretensions, yet as we cannot expect that all readers are of this description, it is much to be feared, that there are still great numbers led astray by such false lights, (*ignis fatui*.)

Brown, Stahl, &c. describe human life, as it might have been, but certainly not as it is—they no doubt, represent it as they imagined it to be; but unfortunately neither of them ever investigated the causes or nature of the functions of any one part of it, either by physicial experiments, or otherwise. But it would be foolish to expect of them, what they never learned themselves, and from what a



few weeks could communicate. But these experimental improvers of medical science, of which we are now to take notice, proceeded in very different modes: from a long, and diligent attention to experience, they advanced in improvement, by a slow but certain progress. But speculators, instead of thus walking would fly, before they have learned to creep; we shall endeavor as we proceed, to detect the bad effects, of being led away by such *Ignis fatui*; we are sorry to be obliged in this place, to take notice of this flimsy romance; but its present popularity merits attention. In the present undertaking, we chiefly wish to confine ourselves to irritability, and its properties, sympathies, vital energies, and the other principles connected therewith.

Dr. Francis Glisson, was the first among the moders, who paid any attention, to this vital property, both in his treatise on the viscera of the lower belly, and in that on the liver, he is the first medical writer, in whose works we find mention made of irritability, which he said resided in a mucus. He defines it to be that property, by which parts can be excited to action, by irritation; he thought the presence of the blood, and of animal heat, were necessary to its perfection. Without this principle, he could not form any rational idea, of the actions of the first passages, nor of the vessels of the liver.

He pointed out the difference between it and (innate,) or inherent strength, which is common to dead, as well as to living matter, and observed that some parts were naturally more irritable than others, as the intestines, stomach, the (sphincter) or circular muscles, and the heart, this vital power, he named *influent*; to distinguish it from the inherent strength, it being different in quantity, at different times: when deficient, langor and depression of spirits follow, if totally obstructed, palsy or torpor, and the profuse waste of it, causes *erethism*, fevers, and deranges the functions of life, both voluntary and involuntary; so that they are either performed difficultly, or not at all, as in accidents, passions, &c.

Robust men have much inherent strength, children, and delicate women, have weak soft fibres, the *influent*, or vi-

tal strength, he believed to be derived from the blood, because it so soon becomes lessened, from want of food, or when the blood is vitiated in quality, as in the scurvy, &c. the principle of nervous energy, or voluntary motion, he knew was derived from the brain, through the nerves; because when they are intercepted by pressure, or division, the parts which they supply, become paralytick, and waste. If the moving solids are deprived of their irritability, they would remain in an inactive state, but their actions demonstrate its existence, he did not clearly understand any difference between sensibility, and irritability, but uses the old distinction of animal, vital, and natural functions, a division as unmeaning as nonnaturals, for every function must certainly be all of them, at the same time, whether they are produced by sensation, or irritation. Many parts are endowed with principles of action, which they seldom exert; but those parts which serve for digestion, respiration, and circulation, are constantly in motion, whilst in health: but the instruments of voluntary motion, only act when we please. He was not able to form an idea, how the functions could be performed unperceived, or involuntarily unless he thought by this means, the fluids were propelled in their vessels, by plenitude, acrimony, and nervous rigor, as in hystericks; although he says the heart is kept in motion, by the influx of the blood into its ventricles, which causes the pulsations, without our perceiving them. And the other functions are all performed imperceptibly. As the motions of some animals after their heads are cut off, and of the heart, even when separated from the body, and the intestines, after they are exposed to view, for whilst warm, they are seen to twist and move, and many other muscular fibres, when pricked; or touched with any acid fluids, and the contraction of the muscles of dead animals by cold; (this would to us appear to be more, owing to elasticity, or inherent strength, than to irritability) and the contractions of the heart, and intestines, &c. when separated from the body was, he thought, a proof that their fibres had perception in themselves. Here he confounds irritability, with sensibility, with the remark that there can

be nothing in the intellect, but what we receive by the senses; but here, it is certainly perceptible to the sight.

He remarked the motions of the membranes of the brain, and supposed that by them, the vital energy was propelled along the nerves; and that perception was returned by them, to the brain, by means of a nervous medulla (or marrow) derived from the brain; and the animal spirits, the agent of muscular, and other vital motions. He believed that every part of the body, which is changeable by disease, was irritable, and depended on a vital influx; even the bones, blood, humours of the eyes, and fat, although they are not sensible. He also observes the inherent properties, and the difference between them, and external impressions, as causes of diseases. He next takes notice of what he names secondary irritations, or sympathies, which he exemplifies by striking the breast with one hand, and endeavouring to move the other up and down; and irritating the fauces with a feather, which promotes vomiting; or vomiting at the sight of another vomiting. Laughter from tickling, &c. and by the stomach sympathizing with the intestines, in cholera or cholics; all of which either palsy or mortification prevents. In the cholic the urine is often obstructed by the sympathy of the sphincter muscle of the bladder with the intestines. Also tastes and smells, and applications to the skin affects the stomach and intestines; and a stone in the bladder, often causes cholicky pains, and so does a stone in the kidneys, often cause vomiting and excruciating pains. The crisis in the fevers, he supposed was caused by sympathy; also obstructions of the biliary ducts, causes cholics, &c. Irritability may either be redundant or deficient, or in a medium between the two—this last state is healthy, the others are diseased. The excess of irritability, he names pruriency, or what we mean by erethism. The defect of it is torpor, (but this is rather the defect of stimuli) and may be caused by a cold temperament, by opiates or poisons. The causes of its excess are weakness, acrimony of the blood, &c.

The next in course of time, who paid any considerable attention to this vital principle, was Baglivi: but although he does not recognize it, by the name of irritability,

he has traced its practical properties, more diligently than any who preceded him—particularly in his work on the motions and diseases of the fibres, (*de fibra motrice et morbosa*.) He also has paid great attention to the sympathies, their operations, and the means of directing and managing them to the best purposes, in the cure of diseases. He traces the doctrines of the animal motions down from Hippocrates, to his own time, which was one hundred years ago: for this father of medical writing had observed an (*impetus faciens*,) or what he called (*to arche*) or the first mover, whose operations were often observed by him, both in their modes of action in diseases, and in their methods of cure. Hence the advantages he often experienced from baths, hot and cold, from frictions, epispasticks, cauteries, &c. of which he made so much use; and also entertained more just ideas of, than many of his successors, especially after the times of Galen, who by his speculations, involved all medical science with Platonic ideas, in a chaos of sophistry, and hypothetical absurdities; in which state it remained, until the times when experimental science began to flourish—when it was liberated also from the no less whimsical speculations of the scholastics. And from those of Galen, and the Arabs, &c. The great attention which was paid to anatomy, within the last three centuries, first taught men to think justly, together with the improvements in experimental philosophy. Baglivi, though none of the first, was one of the most diligent, and successful revivers of the Hippocratic doctrine—paying close attention to the physical operations of causes and effects, in the knowledge and cures of diseases. It is said of him, that he committed the writings of Hippocrates to memory; and those who peruse the writings of both, will have little reason to doubt this. By his close attention to the motions of the moving solids, and to the manner in which they are affected by the vital principle, and the means which he devised in order to discover the vital motions.

But Baglivi's opinion of motions beginning in the *dura mater*, we cannot support, nor is it necessary to his other doctrines; but the strength and elasticity of the solids, and



their moving powers, their oscillations, &c. and the means by which they may be strengthened by nourishing food, and country exercises, are as important now as ever; but the crispatures of the fibres we reject, as it is evident he meant irritations which were relieved by warm bathing, emollients, &c. The worm like (peristaltic) motions of the intestines, and the contractions of the sphincter muscles, and of the heart, he calls a contractile nifus; and the force by which it is performed, energy. Harvey had before Glisson, named the contractile force of the heart, *autopsia*. Baglivi supposes there were oscillatory motions, propagated from the *dura mater*, along the membranes. He mentions irritations, and their effects, although he does not use the term irritability; but this term has of late been used, in a sense too diffuse and undefined. The great power which the solids possess over the fluids, when they are irritated by any stimuli applied to them, as in the manner whereby symptomatic fevers are caused, and also in children, when their teeth are cutting their way through the gums, &c. they cause fevers, diseases of the bowels, &c. and very frequently, even convulsions; and also in grown people, splinters, bruises, or wounds, cause symptomatic fevers, &c. In a wound of the head, stimuli applied to the brain, produced no contractions; but applied to the *dura mater*, they caused violent convulsions—(This may be true, although it contradicts Haller, if the stimuli was applied some time after the wound was inflicted; for in a diseased state, membranes, ligaments, &c. become acutely sensible, although they are not so always; and the sensibility of many parts is increased by disease.)

When the liver, or spleen, are obstructed, or scirrhus; a perspiration can scarcely be promoted in diseases, because of the consent of the stomach, and of the skin through it. Inflammations in the other viscera, act in a similar manner, sometimes on the kidneys, preventing the secretion of urine, which opiates sometimes relieves. The pleura being irritated or inflamed, causes feverishness: severe pains of the joints causes costiveness; and the passage of calculi from the kidneys, or gall-bladder, causes se-

verifhnefs and ftrictures, which are relieved by warm baths, opiates, and laxatives. The epilepsy contracts the voluntary mufcles, and relaxes the involuntary; and frights and hyfteric affections, prevent the catamenical evacuations; but they are reftored by fomentations, warm baths, injections, and anodynes: and fo alfo are obftinate pains of the bowels, &c.

The exceffive irritation of violent emetics, fometimes caufes fpafmodiac affections in the ftomach.

Baglivi has alfo collected much ufeul information, concerning the fymphathies of parts with one another. This he thinks is often caufed by membraneous connexions, and alfo by a fimilarity of ftructure in the parts, or a fimilarity of ufes, or vicinity, &c. caufes fymphathies: The head confents with the belly, (abdomen) and *vice versa*, when the bowels are opened, the head is relieved. The breaft fymphathizes with the genitals, and they with the breaft; fo that difeafes of the breaft are readily relieved by diuretics. The confent between the firft paffages and the fkin, is very evident; for a perfpiration relieves the difeafes of the inteflines, and purgatives often cure the difeafes of the fkin. Difeafes of the liver caufe a dry cough, and difficulty of breathing, and often a dropfy; and bleeding of the nofe accompanys a fwelled fpleen. The biliary ducts fymphathize with the firft paffages, and they with the fkin; hence the bilious vomitings which fucceed the rigors of fevers. The urinary parts are affected by fymphathy with the fundament; and the firft paffages by the kidneys. The liver and gall-bladder constantly fymphathize. Vertiginous and fpafmodiac affections, pafs fo quickly from the ftomach and other parts, to the head, that they were often believed to be propagated by vapours.—Smoaking of tobacco, fometimes excites the motions of the inteflines—fo alfo does fnufling. In calculous, or gravelly affections, there is an itching of the glans penis. In the rigors of fevers, any warm application to the pit of the ftomach, or the foles of the feet, are apt to relieve, or cure them. Standing on a cold pavement, or otherwife cooling the feet, caufes pains of the bowels, laxes, and head-aches, which warm bathing of the feet will relieve.

In injuries of the brain or its membranes, an inflammation of the eyes is mortal, if it happens from the seventh to the twelfth day. Injuries of the brain, cause nausea, vomiting, and sometimes suppurations of the liver. Cold applications to distant parts, often stops bleedings at the nose; so also does sudden fear, &c. Joy or anger promotes the catamenia; but grief or fear stops it. Modesty causes difficult parturition, and often stops the flow of the lochia, or floodings.

Those obstructions of the messentery, which are often the consequences of fevers, are best removed by gentle stimulants, (such as small doses of mercurials and laxatives.) The consent between different parts of the body, and the heart, arteries and veins, is very remarkable in fevers; and also by affections of the mind, &c. The body may be accommodated to different habits by use—much exercise increases the strength, and idleness, or sedentary employments weaken us. Customary times of eating, sleeping, &c. may be changed, although they would, if left to themselves, keep to their own times. A bleeding at the nose in young men, and a lax in old men, relieves fevers. Many phenomena takes place in the human body, which neither mechanical, chemical, or even anatomical investigation can ever explain.

The consideration of strength and weakness, he also thought of great importance. Children and old persons, are both exposed to affections of the bowels; although their real states are so very different; for in children, there is an over great susceptibility of impressions, or an over degree of sensibility, and irritability: but in old age these are defective, and the parts turn callous, &c. so that these are more subject to paralytic, but the young to convulsive diseases; and both are subject to catarrhs, indigestion, mucous excretions, &c. which are remedied by stimulants and strengtheners. The watery eyes, caused by a relaxation of the glands, &c. are cured by astringents and stimulants. The diabetes is often caused, and also cured in the same manner; and also, suppressions of urine from a paralysis of the kidneys, or of the bladder. He recommends exercise, as walking, riding,

dancing, singing, reading aloud, hunting, sailing, &c. for obstructions of the mesentery and weakness. In obstinate cholics, daily riding on horseback, &c. cures them. In the erysipelatose inflammations of the viscera, which take place in fevers, there is a coldness of the extremities—the interior part of the stomach being irritated by acrimony of various species, suppresses the perspiration suddenly, and relieving the stomach renews it. Inflammations of the viscera also stops the perspiration; but by resolving the inflammations, the perspiration is renewed. The pulse is apt to be small in inflammations of the intestines, and parts adjacent. Many, he says, praise Hippocrates and Archimedes; but few read, and still fewer understand them—as scarce one in six hundred: he exhorts to the diligent perusal of his writings. A few medicines well directed, are the best demonstration of the abilities of the physician.

We have given this collection, and translation of these few sentences, as a part of the information to be collected from Baglivi, and as a small tribute to the memory of one of the best of medical writers. We should not despise these observations, merely because they are old—some of them having kept their credit for 2200 years, and all of them upwards of 100, for insignificant novelties.

The name of Haller is conspicuous in physiology. This disciple of Boerhaave, was one of the first who instituted a series of experiments, in order to determine the difference of sensibility and irritability, and other parts of physiology; and to investigate their properties and laws; and his experiments led him to believe, that sensibility was a property of the nerves alone, and that irritability was a property of the muscular fibres only. He found many parts insensible when recently wounded, such as the tendons, ligaments, and membranes, the membranes of the brain, (*dura and pia mater*) and the periosteum of the bones, &c. which both before and since, had been found extremely sensible, when in a diseased state. He concluded from his experiments, that they were always insensible, and this led him into many disputes with the medical practitioners of his time, relative to this part of



his discoveries—both appealing to experience ; but as it happened, they were both right, with respect to the result of their own experiments, but wrong with respect to their opponents ; for the practitioners would not allow, that these parts were insensible in recent wounds, which Haller had found them to be so, neither did they know it ; for it has been discovered since, and the contest settled by farther investigations.

The application of this doctrine to practice, we have very lately found of use, in the investigation of the causes, and mode of operation of the tetanus, which we are convinced is altogether a disease of the ligaments, which by a continued course of irritation, becomes both highly sensible and irritable ; as in the various appearances of this affection, we shall find all the large ligaments of the body, and them alone affected. First the ligaments of the under jaw—secondly, the great dorsal ligament ; the first shutting the jaws—the second drawing the head backwards, or to one side, and bending the whole upper part of the body. The ligaments under the breast bone, causing pain there, and those of every joint of the body, all through which, the twitches fly, with the speed of electric fire. It is also probable, that membranes, tendons, &c. are affected in this disease, from some similarity in their natures and offices.

Haller begins his experiments with the tendons, to which he, and others applied both chymical and mechanical stimuli, without producing any motions in their muscles, or any sensations, in the animals submitted to these experiments. Even in wounds in human subjects, they did not soon become irritable. In the periosteum he could find no sensibility on cutting, tearing or burning, &c. In the parietalium, it was more doubtful ; in three cases the animals appeared to feel it, and in as many others, and in some men, they discover no uneasiness ; the capsulæ of the joints of goats and dogs, being opened, and burned, parched, &c. easily healed. A number of experiments, both by himself, and his friends determined him to conclude the dura mater, to be insensible in trepanning, &c. and even the pia mater, which gives a cover-

ing to each of the nerves, appears itself to be insensible; for in the organs of sense it is cast off, and when separated from the brain, it is not sensible.

The medullary part of the brain, appeared to be the vehicle of sensation, and the principle of motion; the cortex may be wounded without being felt; but it sometimes causes slight convulsions, but in the medulla they produce pains, convulsions, &c. but the vital motions, are performed for some time after. The spinal marrow also, serves for a vehicle of motion, to the nerves arising from it, and wounds of its upper parts are mortal. The pleura also, and peritoneum, were found insensible, also the pericardium. The lungs, liver, and kidneys, shewed no sensation, on being irritated; neither did the vena porta, or celiac artery, irritating the coeliac plexus, which joins these together, caused some uneasiness; this explains the reason why the lungs, liver, or kidneys, may be ulcerated, without causing much uneasiness. Ligatures on the nerves, destroys both sensation and motion in the parts to which they belong. Much pain, and even convulsions may be avoided, by leaving out the nerves in ligatures of the arteries, in surgical operations, &c. Opium allays the sensation; but a succulent nerve will cause motion, for some time after being separated from the brain; wherever its branches are ramified, not by oscillations, &c. for they produce no motion, without muscular fibres; so that they cannot act as cords to the arteries and veins, or to the exhalents, or inhalents, &c. they are not the instruments, but the vehicles of the principle of motion.— It appears that sensibility, is different from irritability, for a nerve may be cut, or tied, and the irritability remain; there are three varieties of contractibility, the inherent, which remains some days after death; this is similar to elasticity; the second is irritability, which may be produced in animals destitute of brain, or nerves—this is by external impressions, independant of the nerves. The third is the nervous energy, or influence, this is governed by the will, or by pain, and is much stronger than the others. The iris of the eye is insensible, but very irritable, it is altogether governed by the impressions on the optic nerves,

their medullary part being spread on the retina, and changes with it. It is a good index of the state of the brain, and nerves. The arteries of cold blooded animals, have no contractibility; those of the warm blooded animals contain a little, he thinks, because they contain some muscular fibres, the strong chymical stimulants prove nothing, as they destroy the parts; but they cause contractions some days after death. But the mechanical are proper, and they seldom cause contractions; the veins were more irritable. The chyloferous ducts, and lacteals, are very contractible by chymical stimuli. The gall bladder, and biliary ducts, are slowly contractible by stimuli, or even by biliary calculi; the urinary bladder is still more contractible, even by mechanical stimuli, especially when full, the ureters are but slowly contractible; the fallopian tubes have a peristaltic motion, and are as irritable as the intestines, which he thinks propels the ovum into the uterus. The irritability of the stomach, would appear to depend on its muscular fibres, as in vomiting, &c. it appears to be less sensible than the skin; when irritated, it is contracted, and its ends are drawn together. The gullet (esophagus) has something like a peristaltic motion, but the midriff (diaphragm) shuts it on inspiration, it is highly irritable.

The intestines contract so as to obliterate their cavities, and sometimes obstruct their passage, their motion is scarce ever absent during life, and for some time after; and may be observed through the peritoneum, purgatives increase it, &c. the straight intestine is very irritable, but obtusely sensible—the intestines are more tenacious of motion, than the muscles, but the heart is still more so. But in hot blooded animals, it is soon destroyed by cold. Irritation of the membrane inside of the wind pipe, caused no coughing; wherefore the motions of the heart, intestines, stomach, &c. are involuntary. Those contractions which are caused by the concentrated mineral acids, and caustics, in the veins, arteries, gall bladder, are not fair demonstrations of irritability; for they corrode all the soft parts, &c. and mechanical stimuli, causes no contractions in these parts, nor in the ureters; but the fuming nitrous

acid, or acid of vitriol, irritates the veins, arteries, tendons, or nerves. These he says, are not irritable in living animals. The skin may answer as a scale to measure sensation; parts which cause pain, when irritated are sensible; these which do not, are insensible, the fat and cellular substance are insensible; all muscular fibres are sensible, particularly the hollow ones, as the stomach, intestines, bladder of urine, but the tendons are insensible, and also the ligaments, periosteum, &c. By his experiments, the bones were found to be insensible in amputations; but he mentions the tooth-ache, as an exception, and so he should diseased bones—and he denies the motion of the dura mater, for it has not room to move; the heart is obtusely sensible, but it is irritated by distention, the sensation of the glands is obtuse, the tongue, the eyes, and penis, are acutely sensible—the medulary parts of the nerves alone, and those parts to which they are distributed, are sensible; but not their membranous coverings.

We come next to irritability, which is, he says, independent of sensibility, *et vice versa*, for the nerves themselves are not irritable—muscles being irritated, their nerves do not move; he denies that the skin, or the nervous membranes of the stomach, intestines, or urethra, are irritable, although these parts are acutely sensible—parts separated from the body, can be irritated, either by means of their nerves, or by stimuli. Tendons are neither sensible, nor irritable, neither are the ligaments, periosteum, membranes, &c. the ramifications of the arteries are irritable, although their large trunks are not—although opium destroys the irritability of the intestines; it does not appear to affect the heart; but when the intestines are irritated, they contract, and form interfusions; distention, either by air or water, causes contractions in the heart, without lessening its irritability, when stimuli fail: they will commonly move until night, but seldom the next day. Distention appears to be the principal cause of the heart's motion; this is a discovery of R. Hooke, much of this property appears to reside in the mucus, which is so abundant in the interior surface of the intestines,



and urethra, so that when wiped off, they will bleed; it is strongest in those parts which are most necessary to life, as the heart, intestines, diaphragm, &c. when parts are dry, they lose their irritability. This is different from every other property of matter, elasticity has nothing to do with it; soft gelatinous animals, appear to be the most irritable, particularly pollypii, &c. which perceives light without any eyes, but these animals are not elastic—children are more irritable, than the aged. Hence it appears to belong to the gluten, of which the young contain most; irritability is totally independant of the mind, or will, it appears to be owing to the structure of the parts, and can be demonstrated by its effects only, cold and dryness stops the spontaneous motions. F. Glisson, thought it depended on perception—the muscles being stimulated, accelerates the motion of the blood: hence inflammations, &c. as L. Bellini thought, but G. Baglivi, came nearer to the truth, than any other, by experiments, he had seen the heart separated from the body, and cut into separate pieces, each of which contained the principle of motion; without any nerves; and muscles contract, without volition. Stahl, and his followers, supposed contraction to be innate, and influenced by the soul, which set them into action, (this is reasoning from metaphysics, to physics, it is like laying a foundation on the clouds.) Boerhaave had seen the motions of the separated heart, by stimuli, but supposed they were caused by nervous influence. J. Woodward, and A. Stuart, made some experiments on irritability, and muscular motion. Animal fibres contract when irritated; the vital organs are constantly irritated; therefore, they continue their motions. De Gorter, wrote on sensibility, to the same purpose. F. Winter, traced all human motions, to fibrous irritability, and stimuli—and so did Kaul & Boerhaave, on the moving power of animals. R. Whytt, allowed that irritation was necessary to produce motion; but that there must be perception. Zimmerman and Oedeurs, demonstrated it by experiments, to be as general in animal fibres, as attraction in the universe. Irritability is separate from the mind, and the soul.

Dr. Kirkland believes, that the nerves convey the medullary substance of the brain, to the muscular fibres, and other parts of the body, which is spread like a mucus, after the nerves have deposited their coats, as in the eyes, ears and nose; by depriving any part of this mucus, it loses its irritability. Whytt called this a sentient principle, and Haller, thought the organization of the parts had a great share in rendering them either irritable, or sensible.

The medullary part of the brain, and nerves, has every appearance of a mucus, and it appears to be conducted to, and spread over every part of the body, for the purposes of sense and motion; which it may be the vehicle of, as readily as a fluid is of electricity. Tying, or destroying only a part of the nerves, of any part of the body, does not always render it paralytic, for other nerves may supply it. Even the point of a needle, will cause irritations all around it, which shews a consent of parts, by means of this mucus; for all the nerves in the body, not being enough to form a cord of an inch in diameter, and going in the straightest possible lines, to the places of their destinations, could not have points terminating so close together, as to cover every point of the skin. The motions in the fibres of slaughtered animals, when laid bare, are caused by irritation; but it ceases by rubbing off the mucus, or by drying, or cooling it. Cold blooded animals retain their irritability longer; as snakes, eels, and the amphibious animals; as aligators, turtles, frogs, &c. he could not be convinced, that any part could be irritable, without being sensible, although he acknowledged irritability in the parts of dead animals. But Haller, found some of the least sensible parts the most irritable, and vice versa, he supposes the nervous fluid as necessary to life, as the blood; wounds of the gray or cortical part of the brain, are not mortal but those of the white, or medullary part are. Thus a part may be irritable, without the stimuli producing visible contractions, as the skin is irritated by blisters, although it does not contract, and by any stimuli, or irritation the glands increase their secretions, and so do the mucus membranes which line cavities, as that of the nose, from

the taking of snuff, or of the mouth, from acrid substances; every sensible part, appears to be irritable, but every irritable part is not sensible. There are great varieties of irritability, according to the state of the parts, and of the patient, it may be either healthy, or diseased, from defect or abundance of it. Children appear to have most of it, for the motions of their hearts are very quick, and the skins of some delicate people, are inflamed by mild ointments, so that irritability appears to be varied by structure, and may therefore be infinite in its varieties, and the same may be said of diseases, as the small pox, hectic fevers, &c. as they all appear to act on the solids: so that true inflammation, erysipelas, or spasm, may be caused by the same irritation, in different constitutions, but there are some difference, between the irritability caused by disease, and that from structure.

The first passages (stomach and intestines) appear to be the centre of sympathy, between the different parts of the body, as we may observe in intermittents, and nervous diseases, the sympathy is reciprocal. In hypochondriacal and gouty patients, the sensibility is so acute as to render life uncomfortable; one patient was thrown into convulsions, by hearing the chipping of bricks; and when he died his liver was found to be very small, flabby, and of an ash colour, here the liver was the seat of the disease.

True, or phlogistic inflammation, which takes place in the robust and young, is very different from the spurious, (erythematic) inflammation of the weak, and aged, a man of fifty years of age, pricked his finger with a fish bone, which was followed by inflammation, matter formed and was absorbed, from whence a diarrhea came on, and carried him off in two days—we have seen the most violent erythematic inflammation, extend up the arm to the shoulder, in an old seaman, from a prick of a needle in the fore finger, in which insensibility, blisters and a livid colour, shewed that a gangrene had taken place, and this persons life, and his arm was saved, by poulticeing and fomenting twice a day; and taking four quarts of port wine, and six ounces of bark, in the course of four days, together with three grains of opium each day, see the ca-

ses, but we believe they are seldom so successfully treated as this was : had this man been bled, and purged, he certainly would have died ; neither could he have borne the loss of his arm ; this and some similar cases, sets the necessity of attending to the state of the patient, in a clear point of view, for a decrease of strength, increases morbid irritability.

The child bed fever, and hysteric symptoms, may, he says, both be present at the same time, and each require their own mode of treatment, and when in conjunction, they aggravate each other.

The low nervous (or typhous) fever, may be subdued by cold air, (or cold water, or opium,) but bark, wine, and cordials are necessary, to support the vital energy at the same time. When the hydrophobia is accompanied with an inflammatory disposition, bleeding will abate it ; but the disease will remain, from the irritability : a lady was so irritable, that setting her foot awry, or pressing her hand against any hard substance, caused vertigo, (or giddiness) and her skin was so irritable, that it could bear neither ointments, nor plaisters of the mildest nature ; the vertigo being accidental, was cured by proper medicines, but the state of the skin was natural and remained as before. It often happens in remittent visceral fevers, that after the inflammatory state is removed, an erethism remains in the skin. These facts shew the variety of irritability, and the different means by which it is to be removed : were the varieties of it well characterised, much uncertainty in practice would be prevented. In some cases opium causes rest, in others it prevents it, but whenever it fails, camphor generally succeeds. We learn to distinguish diseases, as we do persons by their faces, by a species of instinctive information, and from this arises the importance of practice, for language falls far short of all our ideas : hence the preference which old practitioners often get, to the younger ones. The practice in external, or surgical diseases, is the far best introduction to the knowledge of the internal, or otherwise we may both be ignorant of their seats and their natures, the symptoms being often but uncertain guides to direct us. The irrita-



bility, and nervous energy, may be either increased, or diminished, this last state is the most dangerous in general; by attending to this, we have some rules to go by, when there is much irritability, opium is commonly successful; but where the sensibility, is too acute with weakness, camphor is more apt to answer, in case of great weakness the native balsams, as that of Peru, or capivi, and the fetid gums, asafetida, gallbanum, and the essential oils, are apt to succeed, as they increase the strength. When laudanum is given in strong habits, it should be joined with cooling medicine, or antimonial. Peruvian balsam, or oil of turpentine applied to pale ulcers, often does good, but olive oil answers better to irritable, red, and very painful sores for abating pain; but we cannot be certain, in many cases, which may answer before trial, the distinctions are so obscure. It is just the same in internal diseases, for in hysterical cases, camphor, castor, valerian, asafetida, or Peruvian balsam, answer in their turns, and one grain of calomel will salivate one person, whilst ten will not affect others, when the liver, spleen, &c. are obstructed, varieties of irritability may appear as hypochondria, mania, hysteria, or the ague; all different from the hydrophobia, or locked jaw, (tetanus,) the connection of madness, and ague; with spasmodic diseases, is not much known, although really true. Hitherto of general irritability, let us next attend to that which is topical. It is allowed, that inflammations leave parts more irritable, the oftener they occur. Hoffman observed, that spasms caused weakness, and weakness caused spasms; due attention must be paid to this circumstance, in the use of applications.

An ulcer on the leg causing frequent erysipelatous appearances, being dressed with red precipitate, and basilicon when foul, caused the most violent inflammation, which sedatives and time relieved. Precipitate being applied to fungous flesh on the thigh, which had succeeded a compound fracture, caused violent inflammation, rigors, and hectic, but recovered under milder applications, a perpetual blister being applied to a lady's neck, for a pain of her head, the sore became so irritable, as not to heal by

the mildest ointments, but was cured by applying cloths wet with cold water only. These varieties, also extend to the diseases of the interior parts, as the liver, lungs, &c. diseases increase their irritability, and the same varieties of treatment, are to be accommodated to the varieties of the diseases. When the habit of body has been weakened by mercury, such a susceptibility remains ever after, as to be more readily affected by this mineral: the smallest quantity of emetic tartar vomits some persons, but others can scarcely be made to vomit with it at all, and the same with many other medicines. Sympathies owe their origins to irritations propagated along the parts, by means of the nervous mucus to the brain for sensation, and to every part of the body by sympathy, although not perceived by the senses. In this way involuntary affections act, or impressions, whether morbid or healthy: it is more probable that sympathy is communicated in this manner, than along the nerves, or by ganglions. The diffused nervous mucus, is much affected in inflamed sores, or in fevers, the heart consents with the irritated parts, and beats quicker.

A person with an ulcer on his leg, was often attacked with an erysipelas (St. Anthony's fire) on it, and vomiting, in the forenoons, which was cured by applications to the part, after inward medicines had failed. Another person was teased with a cough, during the increase of an abscess on her wrist, but as soon as the matter was let out, the cough ceased; here was a consent between the wrist and the lungs. A sprain of the ankle caused pain, and stiffness of the part, which extended over the whole body, for some weeks after. On taking a scirrhus out of a woman's breast, whose habit was very irritable, rigors, fever, and retching, supervened: but on pressing gently on the part, retching would return, and cease on the removal of it alternately—the wound being inflamed, dry and shining, a decoction of bark relieved these symptoms, as soon as the matter was formed. Irritation produces either true inflammation, erysipelas, or spasm, according to the state of the patient, and the part affected; there are great varieties of all these affections, and they are often mixed in the same person, and at the same time, a livid,

or purple colour in a fore, is a bad sign. Balsams should be applied, with poultices, and bark taken inwardly, for this appearance.

A man aged 40, was attacked with a locked jaw, from a laceration of his heel; opium, bark, and wine failed to give him any relief, together with digestives, and poultices to the part, which was of a purple colour; but on applying balsam of Peru, to the fore, he recovered in about a week.

A young man of a weak and irritable habit, being often seized with convulsive affections, for which medicines gave no relief; was cured by taking a drachm of balsam of Peru on sugar, as often as they returned, and by taking it thrice a day, for a week, with tar water, he was perfectly cured.

Dr. Whytt mentions a case of a young woman, who always coughed violently, when she extended her foot, without intermission, so long as it was extended, but ceased on relaxing it.

An old lady, after a paralytic affection of the left side, had an ulcer on the ankle of the same leg, which was so very sensible, that touching it with a rag, caused spasms of the breast. We often see the effects of irritation go as quick as electric fire, from one diseased part, to other sympathizing parts; by this means Lac Ammoniac, relieves a nervous cough, as soon as it gets into the stomach—and laurel water given to a dog, causes convulsions. It appears, that by lessening irritability in a diseased part, it is also lessened all over the body, and by irritating a diseased part, the whole system is affected with febrile, or spasmodic, or inflammatory symptoms.

Sir John Hunter, was one of the greatest experimentalists of late years—His works are well known. That on the blood merits a diligent perusal. In the introduction he writes of actions, sane and morbid; it must be allowed that a greater action, or force overcomes a less, for in the animal body, they cannot long remain in equilibrio—therefore no two opposite diseases can exist long in the constitution with equal force at the same time, (if they are specifically different, should have been added,) for we know, that

diseases with different names, are often present at the same time, as fevers and fluxes, dropfy and jaundice. But we know that one part, may be more susceptible of any particular disease than others; but if we except the small-pox, and measles, we believe there are very few other specific fevers, which may not be intermixed; but we believe, one predominant mode of action, will overcome all others. The inoculation of the small pox, may be prevented from taking effect, by weakness, as well as by other affections. Sympathies are either sane, or morbid, universal or partial—the nervous and hectic fevers, are universal, other parts sympathizing with diseased parts, are only partial; remote sympathies are, where there is no connection to be discovered, as between a diseased liver, and the shoulders, and many others, which are very delusive—but contiguous sympathies are more common—mortification may either succeed inflammation, or weakness, or cold. We believe that inflammation always causes increased action, and that mortification does not succeed, until the violence of the action is over; and this is the period, in which cordials, bark and wine, and stimulants, are advantageously applied, to prevent mortifications, succeeding active inflammation.

Union of divided parts by the first intention, he thinks, is accomplished by the coagulating lymph, glueing them together. We believe an inflammation of the solids, is also necessary, whether in bruises, or wounds, it is requisite, that both the blood, and the part should be in a healthy state, previous to the injury. But we cannot consider the sprouting of a vegetable, to be in any respect similar to the protrusion of pufs, or extraneous substances, from the interior parts, to the surface of the human body.

With all due respect to the memory of this person, we believe that his divisions of inflammation, are over complicated, and on that account, not so useful, as otherwise they might have been. And if, instead of dividing it into the adhesive, the suppurative, and the ulcerative, he had in the first place, given accurate discriminating rules, to distinguish the active phlogistic, from the erysipellatos, or



the erythematic—they are very necessary divisions, as they require very opposite modes of treatment ; whereas his divisions, are generally a consequence of one another, or only different stages of one variety of affection ; and the scrophulous, and schirrous, or cancerous, would appear to be necessary divisions, but my respect for this progressive work, is too great, for me to attempt any analysis of it.

He endeavoured to trace the vital principle, even to the blood, as his brother, Dr. William Hunter, had done to the apparently inorganic mass of callus, which unites broken bones. We believe, that the vital pabulum, and the principle itself, may be present in the blood, as they apparently were in the latent state, in the eggs, from which he first deduced the idea ; for in them, it only requires the stimulus of heat, to set it in action ; it is in the same state, in the seeds of vegetables. The coagulating lymph, is the agent in uniting wounds by the first intention, and other inflamed surfaces, when in contact, and vessels being produced from it. He also allows of life in the brain, and diffused over the whole body, by means of the nerves, whereby every part is susceptible of impressions—the coagulating lymph appears to be the part from which nutrition is supplied ; but we believe there is organization, blood, and nervous medulla, required, and also, a certain degree of heat, to produce complete animal life. The heat appears to excite action in susceptible parts ; we consider it as an agent, not as a part of life.

On muscular contraction, he says the cessation of irritation, sometimes produce contractions, as in the radiated fibres of the iris of the eye, whereas the contracting fibres contract the iris, when there is much light. It might have occurred to him here, that light is not the native stimuli of muscular fibres, and the fibres which contract the iris, act from sympathy with the retina, and when they are relaxed from the absence of light ; the force of the radi fibres overcomes the others. And we believe, what he calls the stimulus of relaxation, in all other sphincter muscles, may be accounted for in the same manner, from

their force being overcome by a greater, unless so far as the will, or mind, is concerned.

Dr. Munro, in his work on the nerves, says, irritability depends more on the arteries, than on the nerves—for a wound in the leg of a frog, was irritable, inflamed and healed, after the nerve was cut asunder. But when he either tied, or cut the vein, the part could neither be irritated, nor any perceptible sympathy be produced between it, and other parts of the animal's body. Two of the conditions necessary for irritability, in warm blooded animals, are conveyed along the arteries, to wit, heat and moisture. Muscular fibres alone, are visibly irritable; but cold or dryness deprives them of this vital property. The arteries of the nerves, as that of the optic nerve, he says, assists both in receiving, and conveying impressions—we are persuaded that they are necessary, in the organization of all sensible, as well as irritable parts. All parts which are irritable, are capable of being affected by stimuli; whether inflammation, erethism, or spasm, are produced.

The doctor, we observe, will not allow of what Glisson, and Haller, called (*vis insita*) inherent strength, or any other than nervous energy, (*vis nervea*) or vital energy, which Glisson named *influent strength*—but by *inherent strength*, we understand that, which muscular, and other parts possess, both before, and after death. For certainly the parts of a child, are not so strong as those of a person of mature age; and one person is often stronger than another, at all times of life, from various causes.—Neither does Dr. Munro, allow of irritability, being independent of sensation. But we believe, he on some occasions, confounds these properties, particularly after having divided a nerve, and on finding that the part which it supplied, was irritable; by calling this property sensibility, he was under the difficulty of saying, that sensation was produced without perception, or not giving origin to any ideas.

It might have occurred to him, that many plants are irritable, without either brain, nerves, or sense. We are much pleased with his candour, in confessing, that the functions of animals, and the phenomena of diseases, are

not to be accounted for, wholly, by the most accurate dissections; nor by any mechanical; and he might have added chymical investigations, hitherto discovered.—Although he allows, that a quadruple proportion of blood goes to the brain, yet he is doubtful, whether any thing is secreted from it, so as to be distributed by the nerves, to other parts of the body; yet stripeing a nerve downward, was long known to produce action in the midriff: whereas stripeing it upwards, caused no action.

The brain appears to be the seat of the mind, and the nerves to be the avenues, by which it is conducted from the organs of sensation, in the different parts of the body; and from the brain, volition is carried to all parts, which perform voluntary motions—but motions produced by irritation, are independant of the will, and they are often imperceptible: such as digestion, circulation, secretion, &c. Hunter on the blood, contains much useful, physical science, but it is every where to be found.

J. C. Reil, of Halle, in his work on the nerves, says, that they are tubes, containing a medullary substance—Their coats, he says, are stronger, or weaker, in proportion to the energy of the parts, which they supply; the nerves only communicate with one another, by means of their medulla, and their external coats. He thinks every part of a nerve secretes, to supply the waste of the medulla, sometimes independant of the brain; and that they are irritable. Maceration in dilute nitrous acid, (aq. fortis) corrodes the tubular substance of the nerves, and leaves the medulla of a fine yellow colour—the nerves are well supplied with blood vessels, and are subject to inflammation—in typhous fevers, he found them so. The arterial blood, he supposes, co-operates with the nervous medulla, and supplies the waste of it, which takes place, in composition, and decomposition. He thinks, that the functions of the nerves, are not confined to sensation, and volition; but that they co-operate in nourishing the body, and in the production of animal heat; and as the medium of connection, between all parts of the body, equally necessary with the blood vessels, in the functions of life.

As it is impossible, that there are nerves in every part of the body, where sensation and motion exist: he therefore supposed, they had a sphere of action beyond their apparent substance. Kirkland, and Humbold, are of the same opinion, from experiments.

The long disputed fluid of the nerves, was demonstrated by the author, in September, 1800, in the body of W. Patterfon, (who died of hepatitis, &c.) whose case is mentioned. By cutting out a piece of the great nerve of the thigh, and holding it up, and separating the fibrils, with the point of a pair of scissars, whilst yet warm; each fibril was very soon observed to have a little knob, of a whitish, or subalbid fluid on their points, perceptible enough to the naked eyes of many who were present; and by touching, it appeared to be a semi pelucid, fluid. This was before we knew of any other demonstration of it.

In the time of sleep, the sensibility is totally inactive, but the irritability, and the offices performed by it, are as regular as when awake—this shews a difference between these two properties; all animals require sleep. But in some diseases, which affect the nerves very much, as in mental derangements, the irritation, and action of the nerves, is so great, as often to prevent sleep, for weeks together; but in sleep the vital strength (or energy) accumulates, but great and constant stimuli exhausts it very soon. The vital energy also accumulates in those animals, which exist in a torpid station in the winter.—Whilst we pursue the subject of animal life experimentally, and by observations, we may expect to make some progress—but by speculations, we are either led astray, or involved in impenetrable obscurity. And although the functions of the human body, are constantly the subjects of experiments; yet this experimental science has been much neglected, while time, and abilities have been lost in idle speculations.

Irritability has been said to differ from sensibility, in the one being increased, and the other lessened by repetition. But it would be more properly stated thus: impressions which produce actions, are increased in their power, by



repetition ; but where the impression does not produce action, but its effects are lost, or only passive ; they lessen in their power by repetition. This is the case with opium, and with many other medicines, which produce no action ; but when any action is produced, the facility of reproducing it is increased by repetition, unless it is carried to excess—this is the origin of custom, and habit ; any action to which we have been accustomed, becomes very easy by repetition, so that it is even painful to leave it off. The greatest difference between irritability, and sensibility, would appear to us to reside in the organizations of the parts. But it would appear at the same time, that the coagulating lymph of the blood is irritable, and the fountain of this property, and the medulla of the nerves appears to be the part of them, which contains the principle of sensibility ; but many irritations and motions, produce no sensations. Strong irritations always produce sensations ; and from analogy, we believe, that all sensations are produced by irritations, or impressions, which may, or may not cause motions.

Dr. Johnson, physician in Worcester in England, in his performance on the ganglions of the nerves, endeavours to prove, that they prevent the parts which are supplied with nerves from below them, from being obedient to the will ; or sensible ; but that their irritability is increased by them. The nerves he says, are derived from the medulla of the brain, and they spread their medulla over the parts which they supply, we are not able to obtain any soft part separate from this, and cannot therefore determine whether irritability depends on it, or on the blood. From the great ganglion, formed by the sympathetic nerve, and the parvagum, all the parts of the breast and of the belly are supplied ; they are as rare in the voluntary, as they are frequent, in the involuntary parts ; they also prevent the parts from being convulsed, by irritating the nerves above them, they intercept the galvanic stimulus, the ganglions supply nervous energy, during sleep, and happily preserve the parts independent of the mind, and the intestines resemble a gland—the glands appear to have each their secreting stimuli, and their digesting fluids,

for their specific secretions; every part of the body appears to sympathize with other parts, the action of medicines appears to be produced on the coats of the stomach; we are not very sensible of any thing when in the stomach, only that they invigorate, or produce sickness, or vomiting: either a torpor or irritation of the liver, affects distant parts, in weak persons, the motions of the intestines appears to affect the whole system. The vegetable poisons appears to act on the irritable, as well as the sensible principle, causing convulsions, insensibility, &c. Girtanner in his essay on irritability, endeavors to prove that oxygene is the element on which it depends, he thinks that the irritability of vegetables depends on the same: and that it is contained in transparent substances as mucus, &c. Had he made more experiments, and speculated less, his works would have been more convincing, but this one principle, appears to have excluded all others from his mind.—Dr. Darwin's *Zoonomia*, is so well known that we shall not analyse it; so far as it is experimental, we agree with him, but he admits of too many speculations, and but few facts, to be sufficiently convincing.

We have lately had some new views opened in experimental Physiology, by the discoveries of gallsanism, vital chymistry, &c. by F. Humbold; he discovered that motion can be communicated without touch, by an atmosphere of vital power; he also says that hydrogene, and azote, have more to do with irritability than oxygene, it appears to consist of a mutual action, and opposition of different principles; it only appears where there are sensible fibres, which appears to contain the principle of action in themselves, as it can be produced by the contact of similar substances; as well as by the different metals; but it only succeeded with irritable matter. Alkalis, &c. increase, or artificially heighten irritability, the tendons, muscle and nerves of the same animals, appear to cause contractions, by an unequal distribution of the fluid in each, the effect was greatest where the metal, &c. was first applied to the muscle, then to the nerve, then the irritability would be greatest; blacklead, or maganese are the best conductors, &c. all fluids, and mixtures of salts, are perfect

conductors, except oils and fat, but again, soap is a good conductor, but ice or steam, insulates, the scarf skin either of vegetables, or animals insulates, and some men are better conductors than others. Dividing a nerve, does not interrupt this power, if there is a conductor between its parts, neither do they require to be in contact, friction with non conductors, communicates the power to inactive similar metals, as Dr. Wells discovered. Warm blooded animals soon lose their irritability, birds the soonest, &c. a blow on iron lessens, on zinc increases this power, fixed air lessens; but pure air increases this energy, &c. unless there are both nerves and fibres it does not act. Animals which are torpid in the winter, are very susceptible of stimuli in spring, not by an accumulation of oxigene, although such quantities are separated from the blood in the brain. Galvanizing produced an inflammatory disposition in sores, and caused a corrosive discharge, from the mucus glands, by which means it ran from both metals, &c. in large drops; moistening the intestines with a solution of alkali, increased both the peristaltic motion and the pain six-fold. Its action appears to be strongest in the involuntary muscles, &c. the principle he thinks exists in the organs themselves, and the metals are the only attractors of it, whereby they seem to increase it when dull, either issuing out of, or entering into the nerves, it appears to act as a stimulus. The whole phenomena appears to depend on the resistance given to the passage of the fluid, by imperfect conductors: and the force seems to be in proportion to the resistance and this is less, in animal matter, than in metals, and less in similar, than in dissimilar metals. In all living animal bodies, so long as they are irritable, this fluid appears to be in unequal quantities, in the muscles, and nerves; in them new combinations, and decompositions are continually going on: in each organ also, this fluid appears to be in a state of circulation, and to be unequally distributed in different times; a nerve produces no action by touching its own muscle, by being bent back, to it, but if separated, it does act on it by contact, &c. because the fluid is accumulated in the nerve, when separated from its connec-

tions. Galvanism may be considered in the same manner as vitality ; by it volition may perform muscular motion, in the same manner as the metals, by means of the nerves, emitting a greater quantity than usual of the fluid, into the muscles, a change appears to take place, which causes the turgescence of the muscles. As the blood loses its oxygene; hydrogen, and azote are formed, in the animal processes, by circulation, secretion, digestion, exercise, &c. the longer this fluid is accumulated in the nerves, and the greater the hindrance to the discharge taking place, the greater is the effect which it produces. A stronger stream meeting a weaker, carries it along with it, but if nearly equal they balance each other, &c. Dried bones, rarefied air, flame, and warm glass, conducts electricity—but insulates galvanism, this is but a small difference, for these are all very imperfect conductors of electricity, and probably they are as bad insulators of galvanism. Experimental discoveries may be very useful, although the extent of their application does not appear at first.

The most certain test of death, appears to be, removing the covering from a few muscular fibres, and trying whether they are affected by the Galvanic arch ; but electricity may answer better as a means of resuscitation, applied to the phrenic region ; or the arch may be extended from the mouth, to the rectum. It may be useful in diseases of the eyes, (from a torpor, we suppose) or in paralytic, and rheumatic affections. Galvanism, also distinguishes nerves from other parts—by means of the marine, and nitrous acids, Reil discovered the nerves of the chrysaline lens (light) of the eye, and the fibres of gelatinous worms, &c. although all animal, and vegetable fibres are irritable, during life ; they do not all shew this visibly by contractions : for slow stimuli, as hot air, &c. produce no such effect, a medullary fluid seems to flow through the nerves during contraction, for they are weakened by repeated stimuli ; and alcohol, or pot-ash, makes them more irritable, but does not increase their energy. The state of the organs appears to determine the actions of stimulants, or sedatives ; for these substances have not their actions inherent in themselves.



Oxygene, is only one of many agents of vitality. The vital parts recover their exhausted energy, in a little time, and may be irritated again by the same stimuli, by which they were exhausted ; upon this life depends, and a knowledge of it, is of the first importance. Irritability is very different, in different animals ; and even in the same animals, at different times, for every change seems to modify it ; and it is in a continual fluctuation—but it is greatest in torpid animals, in the spring, when getting out of their winters torpor. Heat, light, and electricity, are all stimulants—the depressing, and exhilarating effects of different winds, he thinks, are owing to electricity ; but it is probable, that other principles are as much concerned in this ; for inflammable air appears to hurt it much, so does fixed air ; where these are present, even in small quantities, they hurt it very sensibly. Worms, and leeches, stiffened by a solution of pearl ash, have recovered by electricity ; but if they are only a few minutes immersed in alcohol, they will not recover. Heat increased the number of pulsations, in the hearts of animals—cold either lessens, or altogether stops them, when applied to the naked hearts, either in water, or air—but if a person is put into the warm bath, it increases the external heat, and derives the vital energy, and the fluids outwards, and also, by a soothing quality, lessens the pulse : so that it is apt to cause a faintness, &c. cold continued, will of course increase the strength of the fibres, but heat lessens it—cold is not antiseptic in the living, although it is in the dead fibres. The extrication of inflammable air, appears to be the pernicious principle, extricated from stagnant water. The hearts of cold blooded animals, were stimulated by the blood of warm blooded animals ; but the hearts warm blooded, were not stimulated by the blood of the cold blooded animals. This shews that the blood of cold blooded animals, is less stimulant, and their hearts are easier irritated, as they were applied to the outsides of them, they could not act in either case by distention.

Immersion in pure air, also increases the number, and strength of the pulsations, and causes them to continue longer ; but fixed, or inflammable air, either stops the

motions altogether, or at least depresses and renders them slower; even a deficiency of oxygene, produces less inconvenience, than the presence of these noxious airs.—In an upright position, the pulsations increased in number, in a horizontal position, they decreased with the diminution of energy, especially if the pericardium, with the vessels are tied over it. Azotic gas appears to be the least noxious; the next is the inflammable air; but the fixed air is the worst of all, in destroying the motions of the heart, or lungs; yet taken into the stomach, its effects are rather salutary—hot air, he found to increase the irritability, but it sooner exhausts it. Haller observed the same in the heart; the motions are quicker in hot air, but continue longer, if not exposed to it at first, until they are near ceasing, and then it renews the pulsations, &c. fixed air destroys irritability irrecoverably; the inflammable, or azotic air does not—fixed air changed the red colour of flesh, to a dark brown, but pure air recovers it again.—Inflammable air changes the colour of blood, &c. Air containing one fourth its quantity of pure air, (oxygene) extinguished flame, where there was fixed air present: it is difficult to separate it from pure air: the presence of it, or of inflammable air, renders the atmosphere deleterious; vegetables live in inflammable air, but are destroyed by fixed air, &c. A mixture of inflammable, and fixed air, contaminated with empyreumatic oils, &c. depressed the vital energy, even more than fixed air. Nitrous (azotic) air, was rendered more pernicious, by a mixture of phosphoric air, &c. Spirit of wine increases the irritability at first, but soon exhausts it totally; it hardens, and discolours the muscles: but alkalies soften them again. These effects were more sensible on the heart, than on the voluntary muscles; ether was more active than the spirit. The mineral acids soon exhausts the nervous energy, by convulsive motions, unless diluted; the vegetable acids, would appear to be refreshing when smelled: as they and vinegar sometimes remove fainting: Alkali will not recover a part exhausted by acids; but if the alkali is first used, the energy may be several times raised, and depressed by means of the acids. This led to

the use of alkalies in convulsions, with opium, alternated with acids, successfully. Musk, camphor, and volatile alkali, act similarly with opium—immersion in oil, removed the stiffness caused by arsenic. Bark and galls increased the strength of muscular fibres—ipecacuana, and emetic tartar, stimulates, but weakens. Life appears to consist of composition, and decomposition.

Had we evident, and sensible marks, and accurately defined terms, for every degree of variation of the human body, from the state of perfect health, the practice of physic, would be a far more certain, as well as an easier study; but the investigation and fixing of these different states, has unfortunately for the art, and for mankind been too much neglected. An endeavor to attempt something in this way, is a principal object of the present work. This is something of the nature of what Sydenham wished for; but unfortunately, he, venerable man, like many others of his cotemporaries, took the wrong path for it, by a search after specifics; for this is the pursuit of empyrical practitioners in all ages, and countries. But as any particular medicine, &c. may be always had very nearly the same; this would be a very easy study, was the human frame like a machine, upon which they would always have a certain, and determinate action. But as we are certain, this is not the case, it is to the variations of the state of the human body itself, that we are to apply, as medicines are of no use, but as they are properly applied to it, and possess no proper inherent medical virtues in themselves, but when applied to the living body. Therefore a thorough acquaintance with it, constitutes the beginning, the medium, and the end of physical medical studies, as it is in health and disease. But notwithstanding, this is the pole by which we are to steer our course, in the art of preventing and curing diseases: as the human body is continually surrounded, and acted upon by other physical, and mental causes; we are to extend our researches to them, but always keeping in mind, the *cui bono*, lest we wander into the curious, and neglect the useful, for in this way, much time and labour might be spent, to little purpose.

If we consider medicine as a science, or as a system of rules, it unquestionably, with all its collateral and auxiliary branches, forms a principal department of physics, or experimental philosophy. The knowledge of medicine, however, at present consists chiefly, and almost entirely, of a collection of individual observations, systematically arranged, from which useful rules, confirmed by experience, have been deduced for practical purposes.—Indeed it must be allowed, that we are not yet in the possession of scientific proofs, or analytical demonstrations of these rules, so that we might reduce them to first, and general principles, &c. Our indications for ascertaining their reality, are not sufficiently established; and consequently, have hitherto only had a technical, not a scientific meaning.

Medicine, on the other hand, considered as an art, is still in its infancy; an assertion, which no candid and intelligent practitioner, will attempt to controvert; even for the most valuable therapeutical, and especially the dietetic discoveries, and improvements, &c. We are more indebted to accidental observations, and analogical conjectures, than to an established scientific theory. The *modus operandi* of medicines, as well as regimen, are so far obscure, that the whole difference between the rational prescription, and those which are termed specifics, depends upon the application of rules, by which the technical application of the remedy is, in every instance determined—so long, however, as we are obliged to have recourse to specifics, medicine must remain an imperfect art, and destitute of scientific principles, and unreducible to a systematic form.

Notwithstanding these defects of medical science, we may observe a constant, and strong desire in the human mind, to reduce every phenomena of animal bodies, to general principles, and to explain from these, by scientific deductions, the most suitable technical methods; not merely in an empirical, but philosophic manner, to vindicate our medical treatment, *a priori*, by the general laws of nature, and thus to effect a gradual, though indissoluble connection, between the scientific theory and prac-



tice, and to this object every attempt to establish a theory should be directed.

Physianthropy ought to be the true basis of all medical science, consequently it should comprize the natural philosophy of the human body, its principles, laws, and properties, as anatomy does its structure: the immediate application of the doctrines, of organic animal nature, to man in particular, and to the relation which his structure, and economy bears to the mind—but this is mental, &c. Physiology comprizes the destination of the functions, and parts of the human body, or the knowledge of its healthy state, but this definition is very inaccurate. If we separate zöography from our present physiology, we shall find it much circumscribed, and even the remainder is mostly zoology, being limited merely to the healthy state, not taking notice of the relation, subsisting between the objects of nature, and the changes to which animals are subject. To acquire this knowledge, the relation between animate, and inanimate matter, must be diligently attended to. Our best works hitherto, scarce furnish us with ideas of the organization, and the economy of the vital powers, but their relations amongst themselves, and the agency of external impressions are overlooked, &c.

To consider man in a physical light, the philosophy of the human body, is the first and most necessary division of medical science, and then those things which act upon, or in any measure affects our physical existence; to the first of these divisions, belongs the due exercise of all the functions with ease, and regularity, and in this consists health. But as men are subject to many variations, from due health, and to various and intricate diseases, without which the functions even of health, would not probably have been much thought of, we are in the next place to investigate the causes of these; which we shall find partly owing to variety of conformations, habits, states or temperaments, and likewise partly to the operation of external causes, of various kinds, as aliments, air, or regimen, infections, or accidents of several kinds, and again we are to consider the different remedies for all these maladies, whether externally applied, or taken internally. The intentions

for which we apply them, and their modes of operation, these constitute human physicks, or what may be properly denominated *Physianthropy*.

In the application of this science, we would wish to begin where physicians have commonly left off; and build upon the experiments, and observations, of health, diseases, and their remedies: upon practical phenomena, and from them draw the rules, or laws, of the human frame, as it is acted upon, by other agents in nature, as well as mental causes; and again apply these rules, and laws to practice. This is after the manner of what Lord Verulam, wished to be done in physics, and if any one will but seriously consider, the subject, he will at once see the necessity of this science, over and besides all that is commonly attended to, founded upon the history of medicine, the best of all foundations, for without this, and a strict attention to medical philosophy, what does the common school divisions of medical study teach us? for without this the practice and study of anatomy, can only be useful to us in the manual operations of surgery. And chymistry can only assist us to be preparers of medicines; and what has too much disgraced the profession, hypothesis, and speculations have, too generally been substituted in the place of theory: as those must be convinced who will but take a view of the different systems of theory, which have at different times appeared in the world, ever since Galen. And even long before him. And even the practice of physic, or the art of healing, the end for which all the subservient branches are cultivated, without medical philosophy is neither more nor less empiricism. Therefore he who can manage this most useful science, is to all the others, what the master architect is, to the different tradesmen employed, in erecting an edifice, they do the mechanic parts of the work, but he by a proper knowledge of the whole of the arts, reduced to a science, is enabled to direct them all, in the particular lines of their duties, and to raise a regular structure, both useful and symmetrical in all its parts. Whereas, unless such a science had been formed, to dispose

of them, even after collected, they would only form a confused mass. Just so it is with the collections of observations, and experiments in the medical profession, unless they are duly arranged, and applied; by their vast number, collected during three thousand years, by all the cultivators of the profession, in different countries, they are voluminous enough to cause despair in the student, at the sight of even a part of them. But when their useful parts are skilfully extracted, and arranged, a general chart or map of all may be given in a moderate compass, and afterwards, the particulars may be more accurately delineated by themselves, with tolerable perspicuity. A great part of medical literature, is rendered almost useless, on account of the inaccuracy of the manner, in which facts are related, and the neglect of the collateral circumstances, relative to the sick, and the nature of their diseases: for the bare names of diseases, are very insufficient criterions to judge by, or even the symptoms themselves, unless we are able to investigate the physical causes of the symptoms likewise: for I believe we may take it for granted, that medicines may be had of exactly the same strength, and properties, in any time or place, but we know how different they are, in their operations and effects, but in similar states there can be no doubt, but they would produce the same effects; but as this is not always the case, we must search for the causes, in physsanthropy—and we shall then find, when accurately acquainted with human physicks, that the same causes always produce similar effects; so that we shall find, by attention to this study; that the names of diseases, in their present imperfect states, are of much less use to a real physician, than is commonly imagined: for as many of these names were imposed upon them, when there was very little known of the operations of nature, they are mostly arbitrary, serving but very little to explain the state of the sick, neither have modern nosologists lessened our perplexity, or facilitated the avenues to truth, to take them in the most favourable point of view! and under this head, we may observe the egregious folly of those, who seek after nostrums, antidotes, specifics, panaceas, &c. for there is not one specific in nature, for any one disease,

for they every one fail unless scientifically used. Although the curing of diseases, is what all practitioners aims at ; yet how widely different are their qualification.

The same medicines never can be accommodated to different persons, even in the same diseases, unless the human frame, was as invariable as a machine, and likewise always acted upon in the same manner, by all other agents, as food, air, exercise, &c. and besides age, sex, and habit, are to be taken into consideration ; as also, season of the year, place of abode, and a great many other circumstances : so that it is very easy to perceive, that to be competent to undertake the curing of diseases, to the best advantage, requires a great number of years close application, even of the most apt genius ; and by far the greatest number of men, could never be fit for any such trust, as to determine in obscure cases, where life is at stake ! not more than they could be made poets, mathematicians, chymists, or philosophers. Indeed of all professions, the thoughtless should not aim at being physicians ; for here both extensive information, and genius is required—whereas, information alone, is sufficient in the other professions, with a common share of genius, as the exact line is marked out for them ; therefore, application and memory is all they want. But the physician, the politician, and general commander of an army, stand upon ground, somewhat different ; here much genius is required, as well as extensive information, and a readiness, and decision in applying it to practice ; and yet events, which human prudence could not foresee, often frustrate all their best laid plans, and too often, instead of being judged by the merits of their undertakings, they are condemned through want of success. But if the principles of the healing art, can be reduced to scientific order ; it is undoubtedly an object of sufficient importance, to merit the attention of the students of nature ; but then an important question arises, what is the best method of doing this ; or, have we not a sufficiency of systems already upon the subject ? Of the sort they are, there are probably too many ; but when it can be easily proved, that not one of them, nor indeed all of them together, contain all of our present



acquisitions; they are certainly imperfect, and as we improve in our acquaintance with nature, we should improve, or even discard the old systems, as inadequate to the purpose for which they were intended, by their compilers, or inventors, and go again to the sources of information; and from the history, and the observations and experiments of our predecessors, and deduce rational and useful rules, precepts, and the laws by which all things are governed, relative to the human body, its diseases, and their cures; not representing it as a finished structure, but pointing out its deficiencies, and the methods of correcting them; as well as pointing out its beauties and perfections without exaggeration.

Anatomy may teach us the appearance of the different parts of the body, and their connexions; but their uses, functions, and modes of operating on their contained fluids, and upon one another, and the influence of the mind, or of physical agents upon them, must be learned from a higher source.



*Remarkable Cases in Medical Surgery, &c.*



**I**N my second return from India, in the year 1787, an old seaman, aged about 50, of an irritable habit, having been most of his life at sea, pricked the fore-finger of the left hand, with a sail-needle, and a day, or two after, it began to swell, and was painful; he then shewed it to me, and was directed to put a poultice on it; two days after which, he returned, and having been negligent in the poulticeing; the swelling was extended over all his hand—as the case now seemed to be serious, poultices were prepared for it, of pounded biscuit, and linseed, the only articles we had at the time, for the purpose; but in

two days more, the swelling was extended to his elbow. From this it was both fomented, and poulticed twice a day, and in two days more, the swelling had advanced to his shoulder. The whole arm was as thick as his thigh, it was laid in poultices, and the fomentations continued twice a day, and blisters soon appeared on it—as he was feverish in the beginning of the affection, he had some mild laxatives, and antimonials; but now he had bark, and wine, with laudanum. He took four quarts of port-wine, and six ounces of bark, in four days, with about 60 drops of laudanum, each day. And although a gangrene, had actually commenced, his arm and his life were saved; for the arm had been totally insensible, and livid coloured, and blistered all over. A suppuration took place, up to the elbow, and discharged large quantities of matter.—Here, it is plain, the inflammation was of an erythematic nature; for had it been phlogistic, the wine, bark, and laudanum, would have increased it. He was just recovered, as we got into the river Thames, with only a small sore on the back of his hand, where the matter had discharged, and where a small mortification had taken place. This case was a very plain example of the difference between phlogistic, and erythematic inflammation. Had this been a young, robust patient, other treatment must have been pursued.

A case of a paralytic affection, of the kidneys, cured by the introduction of a catheter.

In the winter of 1796, G. M. aged about 55, who had passed some part of his life in the W. Indies, and had lived freely; but finding it hurt his constitution—he had not for many years past, used any sort of liquors; and he was of a delicate habit of body. In the cold weather, he was taken with a slight feverish indisposition, apparently from the effects of a cold, which appeared to yield to the common treatment readily enough. But what appeared remarkable in his case was, that he made no water, nor had he an inclination to make any; no uneasiness in the parts, nor swelling over the pubis, on searching for it. On which account I did not think the introduction of a catheter, would be of any use at first, as it was plain there was

no urine to be evacuated. He now had several diuretics, but they produced no effect, and often searching above the pubis, no tumefaction of the bladder could be perceived; but the third night, thinking the introduction of a catheter, would give a stimulus to the parts, it was tried, and only about a spoonful, of a glairy mucous substance was discharged; but in five minutes afterwards, he had an inclination to make water, and passed about one ounce, soon after which it returned with the same effect; and continued at intervals, through the night, since which, we believe he had no return of the affection. Here the kidneys must have been the parts affected; for there was no obstructions to the evacuation of the urine, had it been secreted, and the stimulus which the catheter gave, to the neck of the bladder, the urethra, &c. must have been communicated along the ureters, to the kidneys, and renewed their actions. This, and similar cases, points out to us the importance of paying attention to the effects of stimuli, and the sympathies between different parts.

Capt. H. W. Butler, a native of Massachusetts, about 35 years of age, thin and active; had his hand much shattered by a pistol ball in a duel, it entered at the ball of the thumb, broke the bones, and lodged in the outside of the hand—as the pain was excessive the inflammation rose very rapidly for the first week, until it extended to his shoulder. As our first care was to prevent a mortification, the hand and arm were fomented, and poulticed twice a day, and every means was used, such as bleeding, and a dose of salts every two or three days, and antimonials at night, and by these means a mortification was prevented; but a suppuration took place, and discharged great quantities of matter from the arm, and on the first of May, he was beginning to recover, and could sit up, and his appetite was returning, and he had every appearance of being past danger—as he had been much in warm climates, a locked jaw, was sometimes mentioned, by himself, as a possible accident. May 2d, in the evening sitting up beside a window, he probably got cold, and when he went to bed, he mentioned a stiffness of his under jaw; and the next morning it was greater, and gradually

increased for three days, by which time the edge of a dollar could scarce be admitted between his teeth. But from this time it affected him by paroxysms, at uncertain intervals, especially, when he was agitated by any means: such as by any thing falling on the floor, or opening his room door hastily. During these fits, he was all in tremors, every joint of his body was affected with violent rigors—his jaws were firmly clenched, the head drawn backwards, or a little to one side, and he was in a state of insensibility; sometimes they recurred every ten or fifteen minutes: at others, not for several hours. Opium and the warm bath were tried to their full extent; they appeared to be useful at first, but both soon lost their efficacy—bark, and wine, were also tried without success. The doses of opium were increased to four or five grains every four hours, but to no purpose; and he departed May 9th, the 7th day from which this affection began. In these violent rigors, he required several men to hold him, to the last. He was sometimes troubled with a suppression of urine, and he had a pain under the sternum. But from being often with him, I unexpectedly discovered, that the muscles were unaffected in the most violent of these rigors, contrary to what they are in spasmodiac affections.—This disease appears to me, to be totally confined to the ligaments, and they are universally affected all over the body: first the maxillary ligaments, which retains the lower jaw in its place, and the great dorsal ligament, which extends down the back, and those of all the joints of the body, and that under the inside of the sternum, and every ligament of the body, appeared to bear their part in this affection. This young man, having no friend, or relation near him, was one reason for my being more about him than ordinary. This affection assumed all the appearances of tetanus, emprosthotonus, &c. and every ligament was affected, in proportion to its magnitude.—We believe this observation is new in the pathology of this disease; and we suppose it is always the case, in these affections, although they have been called spasmodiac, or convulsive.



A case of the catalepsy, which appeared in Philadelphia, in August, 1793.

On the first of August, about 8 o'clock in the evening, I was called to a Mrs. Cooke, who lived at No. 78, South Third Street, who had every appearance of being dead. She was moderately plethoric, apparently of a soft or phlegmatic habit of body; she had been married for some years, but had no children; not having been the first physician they had sent for, although the first they found at home; she had been taken some time before I saw her, and found her laid on a bed, without any appearance of life, or motion, either in her breast, her heart, or pulse, and most of those about her, actually thought her dead—as it was very warm weather at the time, she was moderately warm. If there was any motion of the pulse, it was so weak, as not to be perceptible; when her arms, or legs were moved, for they were flexible enough, on lifting them up, or stretching them out, they would remain in whatever position they were put into. My first attempt was to apply common snuff to her nose, and to pour spirit of hartshorn, and water down her throat, but to no purpose. Next we attempted to draw blood from her arm, but could procure only three or four ounces, its motion was so very slow—frictions of her arms, breast, and legs, were also used to as little purpose; with some degree of agitation of the trunk of the body, in order to excite the respiration, and propel the circulation, but to no effect; spirit of hartshorn, had been applied to her nose, and rubbed to her temples, and wrists—the windows were open all the time, and fanning her to renew the air. Vinegar had likewise been used to her nose, but to no purpose. We supposed there was a vermicular motion of her pulse, but could not be sure of it—by this time I had been with her about half an hour; but now happily hit upon the only plan, which we believe would have roused her—for her husband, and those about her, thought her dead, and were preparing to lay her out, and bury her. But that which first had any effect, was an emetic, of tartar emetic, two grains, and six or eight of ipecacuana, and forty, or fifty drops of the volatile aromatic spirit, in a

spoonfull of water, which we had to repeat, two or three times, before the quantity specified, could be forced down her throat, as it run out of her mouth, the same as though she had been dead, without any effort, or motion of her own, either to swallow, or avoid it. We endeavoured with a handle of a spoon, to force open the passage into her pharinx, and to try to force some of it down, which after several attempts, we partially succeeded in; and at last, from the irritation of the spoon, and the fluid together, we could for the first time perceive, some symptoms of her sensation returning; the palate, and neighbouring parts, seemed to be the first which had any appearance of sensibility, for by the irritation of them, we first perceived that she made a faint effort with her jaws, to avoid the introduction of the spoon: we persisted however, until we had forced down, what was judged sufficient to vomit her, and then let her alone for some time. For the stomach, as we had judged, was yet sensible to the effects of the emetic, which began to operate in half an hour; and from the first effort of the heaving beginning, her senses returned gradually, and in about half an hour after, she was quite sensible—this was an hour and an half, or two hours from the time I had first seen her; and about three hours from the time she was found insensible; as soon as she could speak, she complained of a sense of suffocation, and oppression of the breast, &c. By this time we had leisure to inquire of the woman of the house, (whose name also is Cook, and lives yet in the same house,) how, or in what manner she was taken—she informed me, that when she was going to her tea, in the evening, the patient was sitting in the room with her, and she asked her, if she would have a dish of tea, which the patient refused, and sat still in the same place, apparently low spirited; but in a short time after, on looking towards her, she was exactly in the same place, and position; but now something in her countenance, appeared very uncommon; she spoke to her, but the patient sat as a statue of marble, without any motion in her eyes, or appearance of life; she then was terrified, and called in the neighbours, who tried several means to rouse her, but without any effect, and they had carried her up to the

bed, where I found her in the manner already described. A Mr. Liddel, a joiner, who lived opposite, was with her the whole time.

August 2d, She complained of great pain, and oppression of the breast, and difficulty of breathing, and as she had been labouring under obstructions of the catamenia, for some time, we therefore repeated the vene section to ten or twelve ounces, and gave her half an ounce of Rochel salts, as she was costive. And at going to rest, (as she was a little feverish) she had an antimonial draught, with a few drops of laudanum, in order to cause a perspiration, and procure rest in the night, which she had not enjoyed well the night before. 3d, The oppression of her breast, and feverishness, were both much alleviated; she had the same medicines, repeated at night as before. 4th, She complained of great oppression, and lassitude, all over her body and limbs, for which she had the saline mixture, with volatile aromatic spirit, forty drops, and antimonial wine, twenty drops every six, or eight hours. The 5th, and 6th, the mixture was repeated as before. 7th, as she was weak, but not feverish, she had pills composed of extract of bark one drachm, salt of steel one scruple, made into twelve pills; of which two were directed to be taken morning, and evening—by this time she was able to sit up, but she was weak, and languid, as one recovering from a violent fever; but she recovered gradually.—11th, The pills were repeated as before; she took them as a restorative, and was entirely recovered by the 14th. and never since, nor before, had any return of this affection, or of any thing similar to it, although she sometimes had slight hysteric, or nervous affections—she always after said, that I had saved her from being buried, and it was probably the case.

This I believe, was a true catelepsy, and as it is a rare disease, which many medical gentlemen never have an opportunity of seeing, I thought it my duty, not to suffer it to be lost, especially as the successful method of treating it, is here along with the description—as it was the first case of the kind I had ever seen, I was directed in the cure of it only by medical philosophy.

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*To the friends of Experimental Medical Science.*

AMONG the varieties of medical studies, there are some of much greater importance than others; but the number of objects are so various, as in some measure to distract students, when they attend to them each in particular. But by beginning with giving general views, and from them descending to particulars in an analytic method, much confusion may thereby be prevented, neither are the principles and practice, of the whole of the healing art, incompatible with each other, for they never can be fully or clearly understood, when separated; and what every person who intends to cultivate the profession, should learn, there should certainly be some persons capable of teaching, as far as language can assist. The principles of physic and surgery, are the same, and surgery is beyond all doubt, the only sensible, and rational mode of introduction to the practice of physic, and in a course of elementary instruction, we believe they should always be united, at least in a first course, and the subdivisions might be attended to, with more advantage afterwards—besides there are many, who would willingly attend one course of instruction, who cannot readily attend six or seven. Here we propose to confine ourselves to the physical nature of the human body, and its different conditions when in health and diseased, and the effects of the different departments of regimen, such as exercise, or modes of life, food and drink: and the effects of the different states of the atmosphere; whether cold or warm, pure or adulterated, the different temperaments, ages and sexes, the effects of morbid impressions, and the operations of medicinal applications, to obviate or cure them. When we leave out antiquated theories, and useless speculations, we shall find the indispensably useful parts of the science, and practice, reducible to the moderate extent of one course, which when completed, will amount to, from ninety six to one hundred lectures.



The means of preserving, and of restoring health, by the various departments of the healing art, as by regimen, medicines, surgery, &c. and the sciences connected therewith; but particularly physiology, shall be duly attended to, with their applications. In the present situation of the principles and practice, the relation between natural philosophy, and the medical science, is so obvious to every one who is acquainted with these subjects, that they have been compared to twin sisters, which languish and pine, when separated. And it has been the sentiment of many of the most eminent philosophers and physicians, that if true medical science was more generally known, so as to form a part of a liberal education, the improvements in it would be more rapid, and it would be held in greater estimation, with the well informed part of the world; for by this means, they would be enabled to distinguish the intelligent practitioner, from the ignorant pretender; and the idle speculator, from the collector of facts, and the scientific deductions of experience. Hereby hypothesis would be exposed, as well as the absurdity of empiricism detected.

Physic had its origin in experiments, made either accidentally, or by conjecture; but this is no good reason, why we should always remain so; for a long course of experience leads to rational deductions, and these again lead us to carry on our experiments, and observations, in a more scientific manner. All arts and sciences had their origin in necessity, observation, or experiments. But as a great number of observations, &c. only tends to confirm the same truth, we come more directly to the purpose, by collecting the principles, and laws resulting therefrom, by only tracing the remarkable occurrences, which have led to them. This mode differs widely, from that of assuming principles, &c. upon conjecture, and founding hypotheses upon them; so that although the healing art may be only experimental, as it was in former times to all its members, or even conjectural to the less informed; it is a rational science, to well informed physicians of the present day. The bare historical part, comprehends the experimental, but the physical reasoning on the principles,

and laws, are collected from this, and from practice, so that the difference between empiricism, and experimental science, is by this means illustrated, and their different merits and uses explained at large, in a manner comprehensible to most persons.

It appears to be the most useful, and comprehensive manner, to begin by giving a general view of our different subjects of investigation, upon a small scale, in a connected manner, and from that to proceed to the particulars, in the amalytic method—the former is best adapted to teaching, and this to improvement; these two ways of pursuit have seldom been united in any course of instructions. The historical introduction, will of course be synthetical; the scientific, will be in the analytic mode of inquiry; and the practice, the result of all the parts, by a diligent collection of faithful experiments, and reasoning upon them.



*The Physical Principles of Medical Science ; and their application to Practice.*

I. **H**ISTORICAL, and Introductory Preliminaries.—The progress, and present state of the principles, and practice of the art of healing, in various parts of the world, and at different periods of time.—The doctrines of the different sects in medicine, the causes, and consequences of their particular tenets, their enthusiasms, &c.—The best method of studying, of observing, and improving medicine investigated.

II. Phylanthropy, or the physical nature of the human body, and the manner in which it is affected by external agents.—The properties, principles, and laws of human life.—The varieties of constitutions, and temperaments.—The causes, phænomena, and *modus agendi* of morbid affections, &c.—The genera.—Species, and varieties of diseases, &c.

III. The modern improved practice, of the various departments of the healing art, by means of regimen—medicinal—or surgical applications, deduced from observation, experience, and reason.—The genera of diseases we mean to arrange, according to their physical natures, deduced from their phenomena, symptoms and remedies, &c. and in ascertaining the species, we are to consider the causes, natures, and treatment appropriated to them.—The varieties are learnt from the appearances, &c.—The genera and species, and their proper distinctions, separations, &c. is the most important and difficult part of our division ; as in remittents, intermittents, and fluxes, we are not always able to ascertain them. These may be denominated converging, and evanescent, and we must depend on their causes, and their various appearances from the preceding, and present state of the patients.

# A SYNOPSIS of the Genera and Species, of the principal Diseases of the Human Body.

Genus I. Species.		Genus IV. Species.	
<i>Accidental</i> or <i>Surgical</i> <i>Diseases.</i>	Luxations	<i>Paralytic</i> <i>affections</i>	Palsy
	Fractures		Apoplexy
	Caries		Catalepsy
	Rickets		Coma
	Exostosis		Syncope
	Anchylosis		Dyspepsia
	Sphacelus	Hypochondria	
	White Swellings	Dropsies	
	Inflammations		
	Phlegmonous		
	Erysipelatous		
	Wounds		
	——Simple		
	——Lacerated		
	Ulcers		
	——Simple		
	——Fistulous		
Tumours			
Scrophula			
Scirrhus			
Cancers			
Herniæ			
Cataract			
Stone			
Parturition			
Genus II. Species.		Genus V. Species.	
<i>Fevers,</i> <i>periodical</i> and <i>continued,</i> <i>converging</i> and <i>evanescent</i>	Symptomatic	<i>Morbid</i> <i>excretions</i>	Cattarrh
	Intermittent		Coryza
	Remittent		Diarrhea
	Continued		Cholera
	Synochus		Dysentery
	Typhus		Hamoptysis
	Pestilential		Menorrhagia
	Small-Pox		Leucorrhea
	Measles		Gonorrhœa
	Puerperal		
Hectic.			
Genus III. Species.		Genus VI. Species.	
<i>Spasmodic</i> <i>Diseases.</i>	Convulsions	<i>Pains</i> <i>of the</i> <i>membra-</i> <i>nous</i> <i>parts,</i> <i>not</i> <i>suppurat-</i> <i>ing.</i>	Pleurisy—true and
	Hysteria		——Spurious
	Hypochondria		Gout
	Epilepsy		Rheumatism—true
	Hooping Cough		——and Chronic
	Nervous Asthma		Cholic
	Tetanus, &c.		Head-ache
	Hydrophobia		Tooth-ache
Mania.	Eye & Ear-ache.		
Genus VII. Species.		Genus VIII. Species.	
<i>Miscella-</i> <i>neous</i> <i>Diseases.</i>	Ptyhis, &c.	<i>Feminine</i> <i>affections</i>	not comprehended.
	Scurvy		
	Jaundice		
	Scrophula		
	Herpes		
	Pfora		
Syphillis.			
Genus IX. Species.		Genus X. Species.	
<i>Puerile</i> <i>Diseases</i>	not comprehended.	<i>Puerile</i> <i>Diseases</i>	not comprehended.
TOTAL—75 Species.			





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